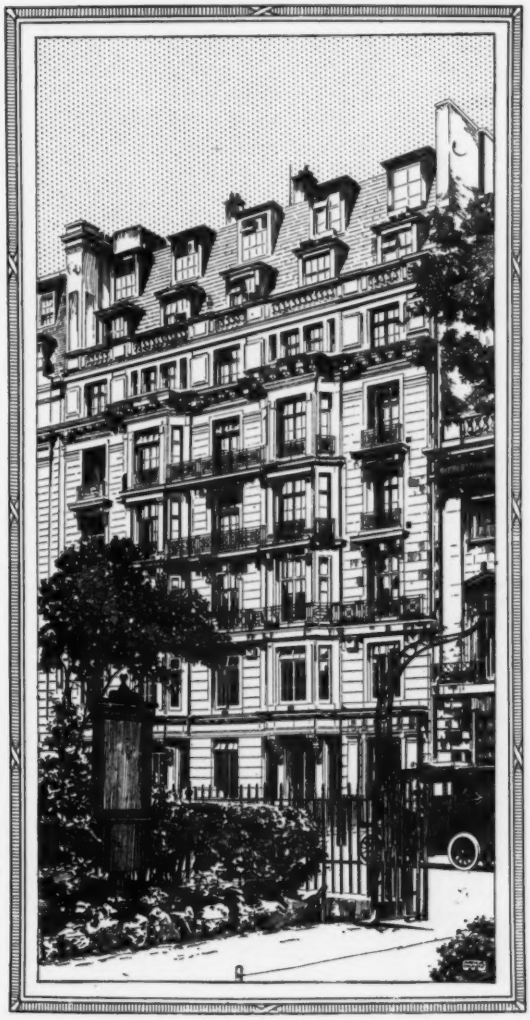
The ENGLISH ELECTRIC JOURNAL



Queen's House from Lincoln's Inn Fields.

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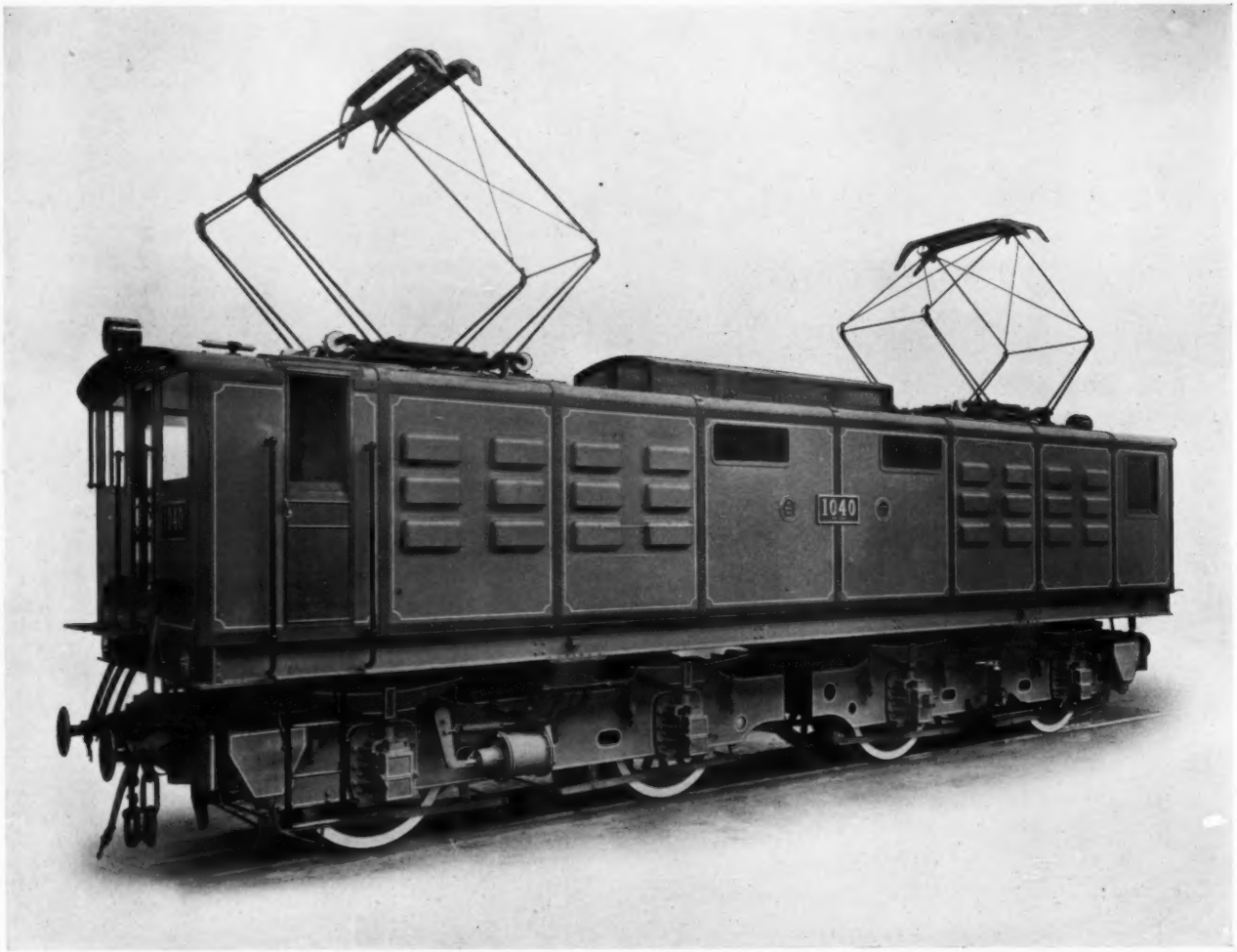

A 59-ton, 1224-H.P. Electric Locomotive for freight service. This is one of 36 locomotives ordered from The English Electric Company by the Japanese Government Railways. The mechanical parts have been built by the North British Locomotive Company and the electrical equipment at the Dick, Kerr Works, Preston.

The English Electric Journal

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EDITORIAL.

All Communications respecting Editorial Contents should be addressed to THE EDITOR, THE ENGLISH ELECTRIC JOURNAL, QUEEN'S HOUSE, KINGSWAY, LONDON, W.C.2.

THE WORK OF 1922.

This number of the Journal is devoted to a series of illustrations of machinery and apparatus constructed or put into operation by the English Electric Company during the year 1922. These are arranged in four sections—Electric Traction, Prime Movers, Generation and Distribution, Electricity in Industry, and Aircraft. The illustrations are comprehensive in the sense that they range over the whole field of the Company's manufactures, but in any particular part of that field they are representative rather than complete, since considerations of space have made it impossible to reproduce more than a relatively small selection of types of plant. What is shown will be sufficient, however, to make it clear that although 1922 was a year on the whole of bad trade, it was also a year in which many large electrical contracts were carried out and new development in many directions undertaken.

Tech
J. Jub.

Electric Traction.

New railway electrification work since the war has been practically confined to countries other than Great Britain. Of the contracts which have been placed, always after keen international competition, the English Electric Company has obtained its full share, and the illustrations will give some indication of the extent to which the Company's railway apparatus has been adopted on different systems.

In France extensive electrification projects are in hand and the fullest use is being made of the abundant water-power resources of the country. In all these schemes the English Electric Company, through its French associates, the Constructions Electriques de France, has an important interest. The contract for the electrification over a period of 12 years of large sections of the Midi Railway was placed with the Constructions Electriques de France some time ago and the first locomotives, one of which is illustrated on page 169, are already in operation. The electrical equipment of these locomotives was manufactured at Preston, and plant of "English Electric" design has been adopted throughout by the Midi Railway. Other important orders have been received by the Constructions Electriques de France for the Paris-Orleans, the Paris-Lyons-Mediterranean and the Moroccan Railways.

The Imperial Japanese Government Railways in 1921 ordered two locomotives each from four firms, two American, one Swiss and one British—the English Electric Company. In the summer of last year they placed a contract with the Company for a further 34 locomotives —the whole of their requirements for their electrification scheme up to the end of 1923. Rapid progress has been made with this work. The first locomotive was shipped in February and delivery will be completed in August. The illustrations will give a clear idea of what has been done. The mechanical parts of these locomotives have been built in Glasgow by the North British Locomotive Company and the electrical equipments at the Dick, Kerr Works, Preston. This is the largest order for electric locomotives which has ever been carried out entirely by British manufacturers.

Another type of locomotive is that illustrated on page 171, which was supplied to the New Zealand Government last year for the electrified section of the Midland Railway. A comprehensive contract for the whole of that electrification has been carried out by the English Electric Company and the line will be opened for electric operation during the next two months.

In all these contracts, which are for high tension direct-current systems, the type of control adopted is the "English Electric" camshaft control, which is protected by patents and has been entirely developed in England by the Company. The same type of control equipment has recently been supplied or is under construction for motor-coaches for use on the Cataluna Railway in Spain, on the Midi Railway in France, on the Noord-Zuid Tramways in Holland, on the Nagoya, Ome, Keihan and Keisei Railway Companies in Japan and on the Great Indian Peninsula Railway.

If we turn to tramway equipment, Dick, Kerr motors and controllers are found all over the world and important orders have been completed or put in hand during the year. Liverpool, Bolton, Edinburgh, the Dearne Valley Light Railway in this country, Toronto, Adelaide, Sydney, Tokyo, Pernambuco, Montevideo and Cordoba abroad, are some of the larger recent purchasers. At the Car Works in Preston the building of car bodies for tramways at home and abroad has continued, and, as the illustrations show, valuable orders have also been received for motor-bus bodies.

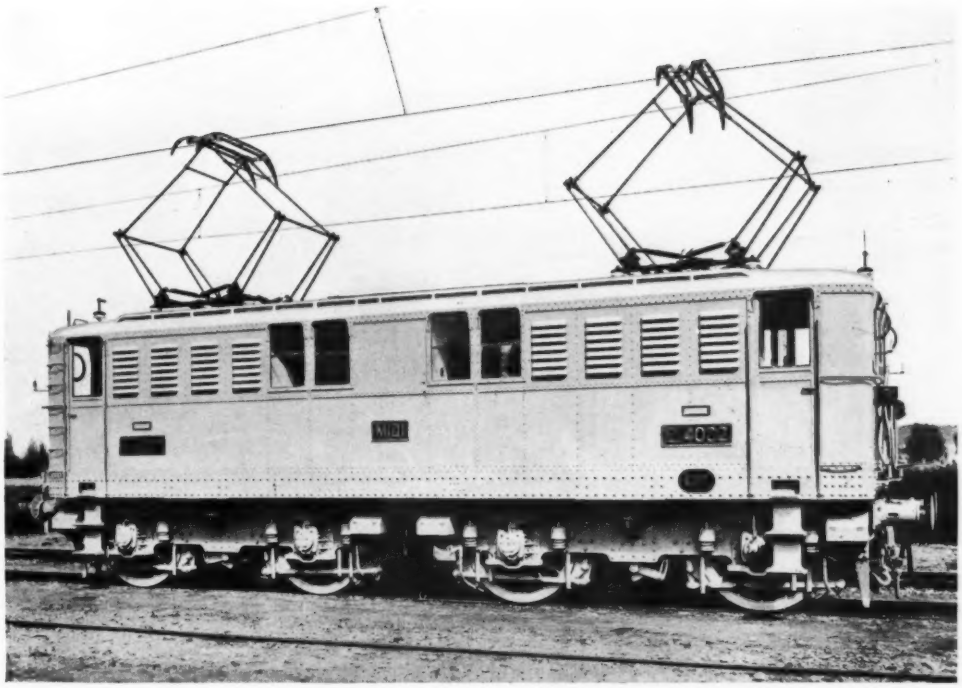


FIG. 1. ELECTRIC LOCOMOTIVE FOR THE MIDI RAILWAY OF FRANCE; BUILT BY THE CONSTRUCTIONS ELECTRIQUES DE FRANCE AND EQUIPPED ELECTRICALLY BY THE ENGLISH ELECTRIC COMPANY.

Railway Equipments supplied for The Midi Railway of France.

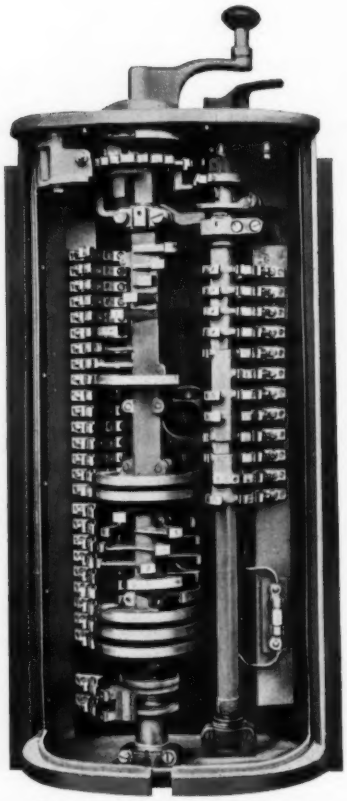


FIG. 2. MASTER CONTROLLER.

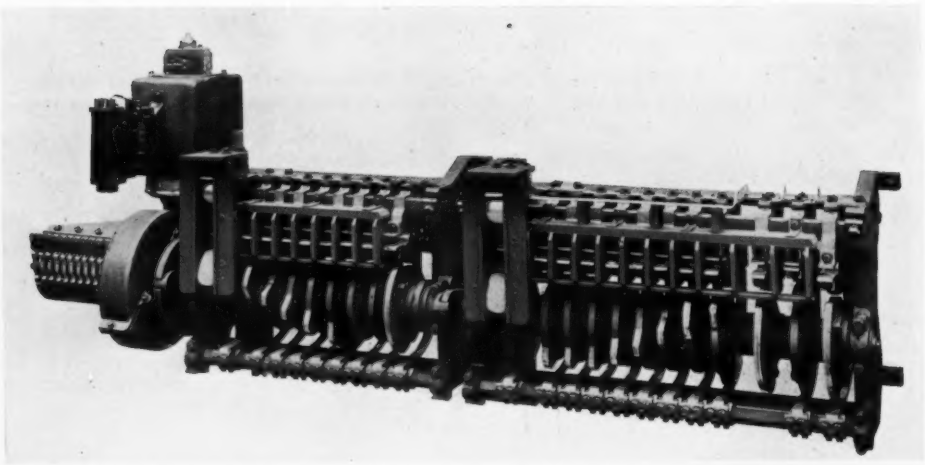


FIG. 3. "ENGLISH ELECTRIC" CAMSHAFT CONTROLLER FOR ELECTRIC LOCOMOTIVE.

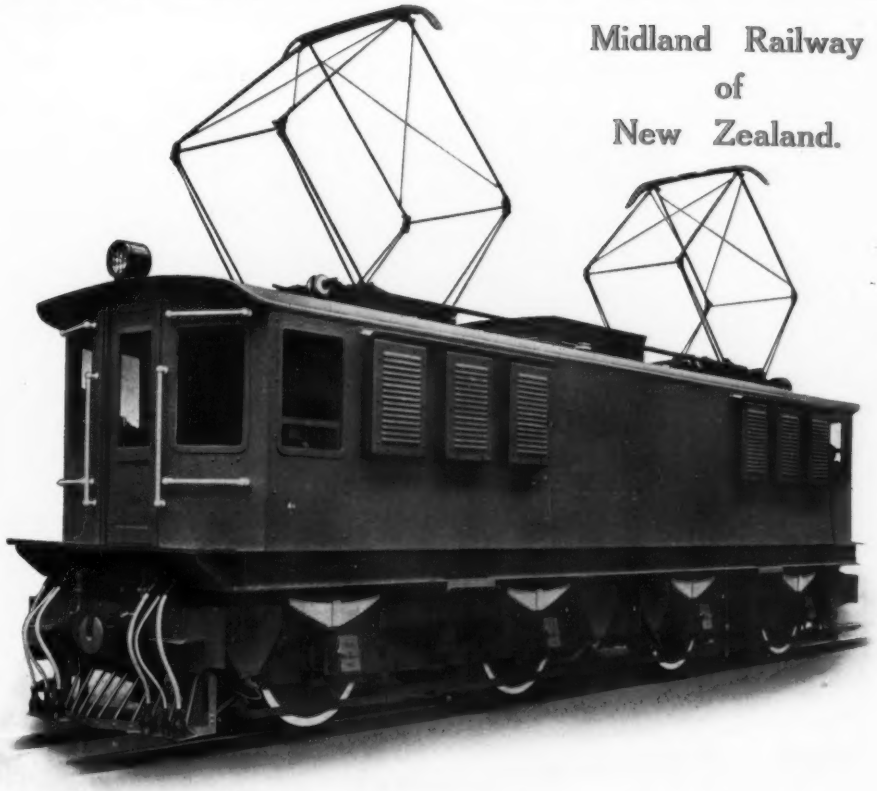


FIG. 4. ONE OF A NUMBER OF ELECTRIC LOCOMOTIVES BUILT AT THE DICK, KERR WORKS, PRESTON, FOR THE NEW ZEALAND GOVERNMENT.

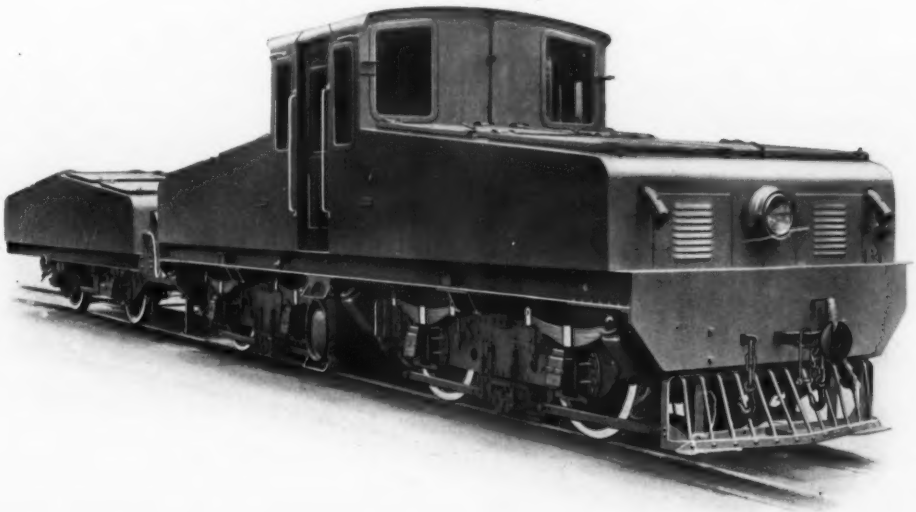


FIG. 5. LARGE BATTERY LOCOMOTIVE WITH BATTERY TENDER SUPPLIED TO THE NEW ZEALAND GOVERNMENT FOR SHUNTING AND OVERHEAD LINE MAINTENANCE.

Japanese Government Railways.

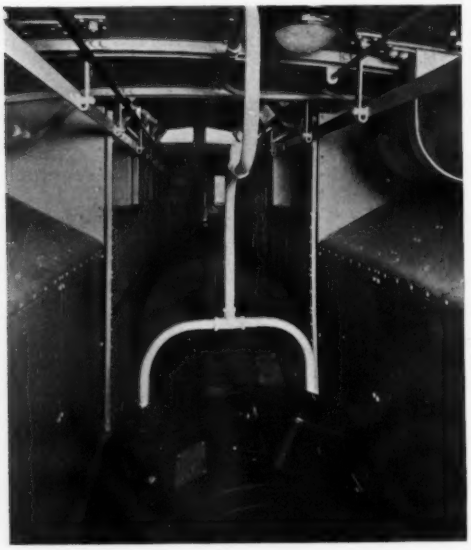


FIG. 6. INTERIOR OF LOCOMOTIVE, SHOWING AUXILIARY MACHINERY.

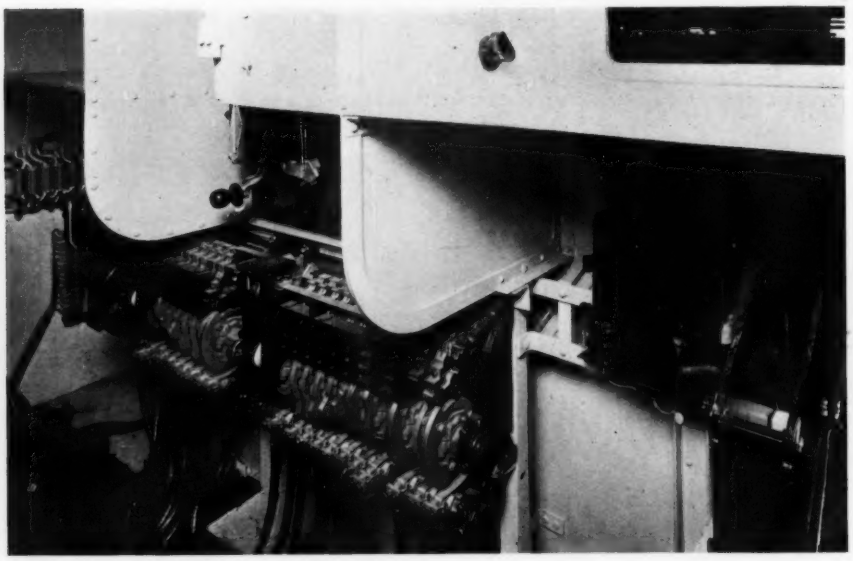


FIG. 7. THE "ENGLISH ELECTRIC" CAMSHAFT CONTROLLER.

Japanese Government Railways.—*(Continued.)*

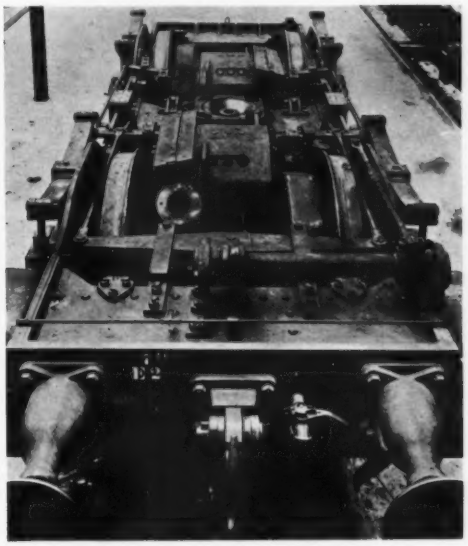


FIG. 8. A LOCOMOTIVE BOGIE.

FIG. 9. LOCOMOTIVE BODIES UNDER CONSTRUCTION IN THE WORKS OF THE NORTH BRITISH LOCOMOTIVE COMPANY.

Japanese Government Railways.—(*Continued.*)

FIG. 10. LOCOMOTIVE BODY BEING HOISTED ON BOARD AT LIVERPOOL.

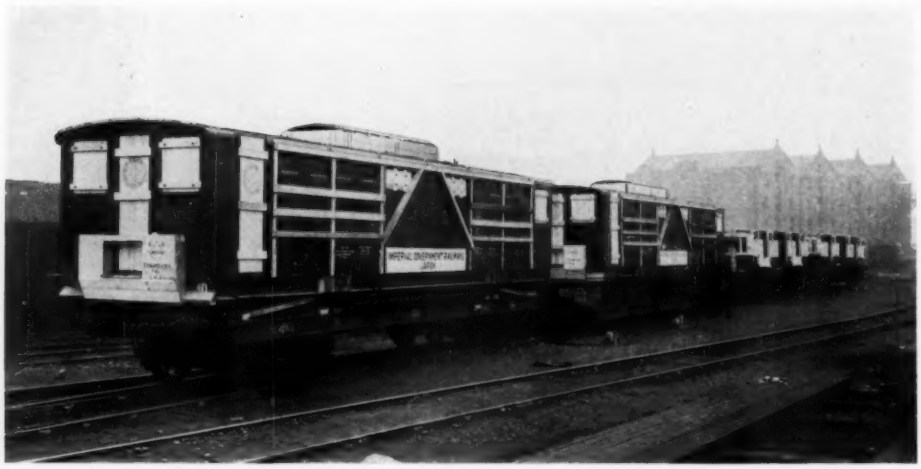


FIG. 11. LOCOMOTIVES PACKED ON RAIL AT PRESTON.

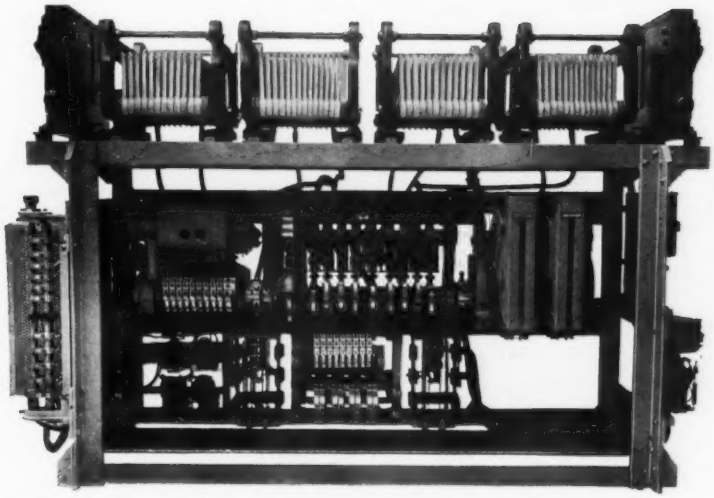


FIG. 12. "ENGLISH ELECTRIC" CAMSHAFT CONTROLLER FOR MOTOR-COACH TRAIN, ARRANGED FOR MOUNTING IN DRIVER'S CAB.

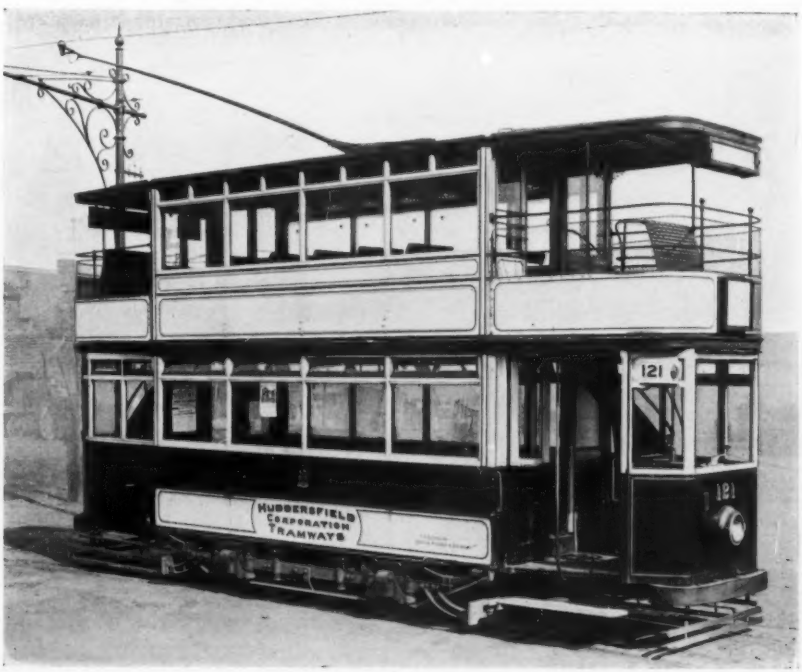


FIG. 13. A TYPICAL 4-WHEEL DOUBLE-DECK TRAMCAR.

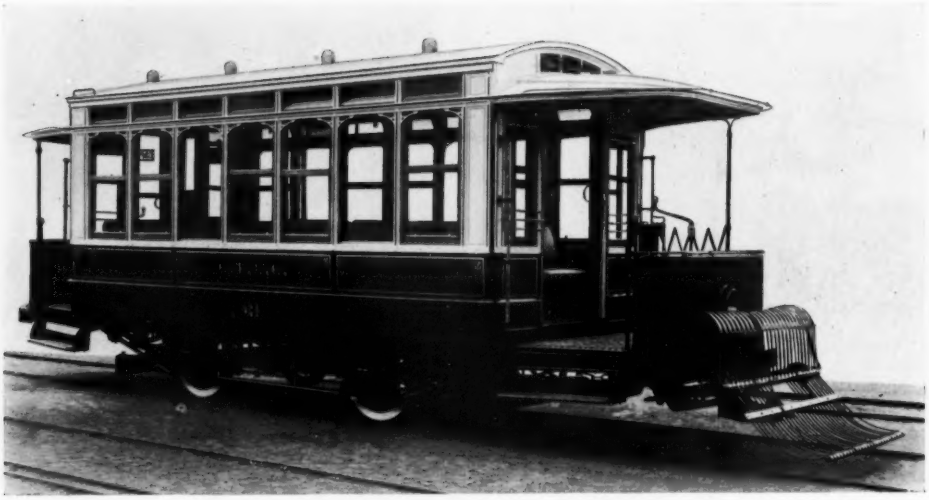


FIG. 14. TYPE OF CAR FOR SUB-TROPICAL CLIMATES, AS SUPPLIED TO THE CORDOBA LIGHT, POWER & TRACTION CO. (ARGENTINE).

FIG. 15. OPEN SINGLE-DECK TRAMCAR FOR TROPICAL COUNTRIES AS SUPPLIED FOR PERNAMBUCO.

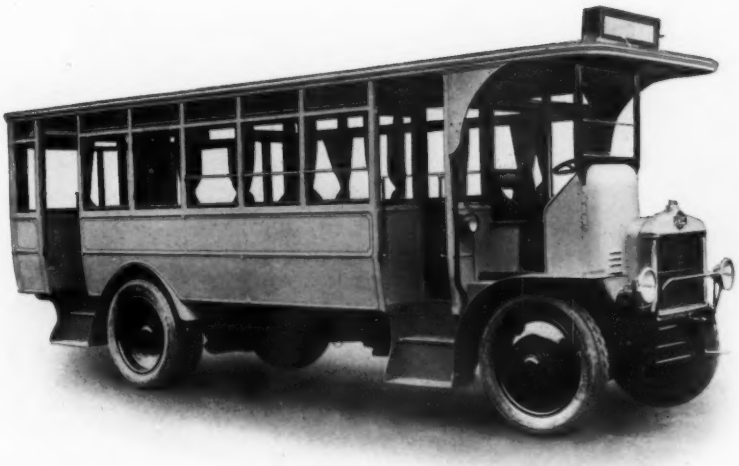


FIG. 16. SINGLE-DECK MOTOR-BUS BODY SUPPLIED FOR MEXICO CITY.

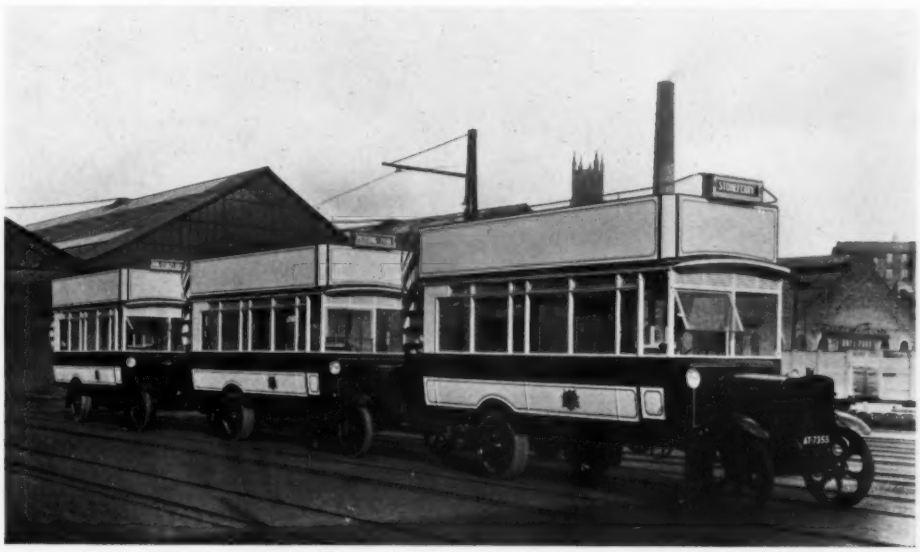


FIG. 17. MOTOR-BUS BODIES BUILT FOR THE HULL CORPORATION.

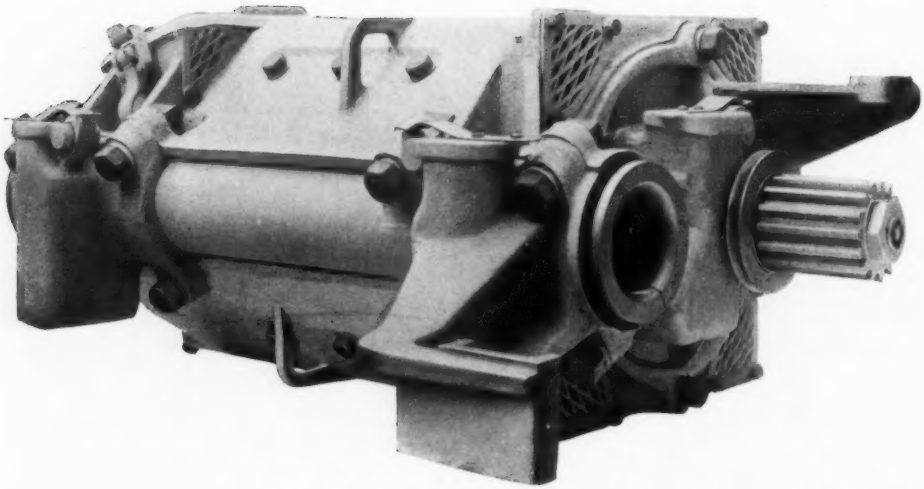


FIG. 18. THE D.K. 34 VENTILATED TRAMWAY MOTOR FOR LOW-STEP CARS.

FIG. 19. A VIEW IN THE TRACTION MOTOR SHOP AT THE DICK, KERR WORKS, PRESTON.

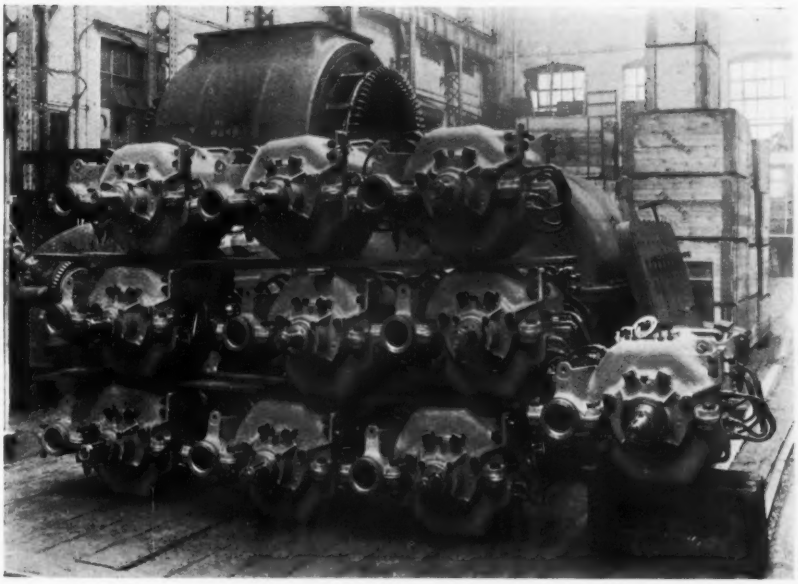


FIG. 20. A GROUP OF D.K. 20.A. MOTORS FITTED WITH ROLLER BEARINGS, AS SUPPLIED FOR THE LIVERPOOL CORPORATION TRAMWAYS. OVER TWO THOUSAND D.K. MOTORS AND SEVERAL HUNDREDS OF CONTROLLERS HAVE BEEN SUPPLIED FOR THIS SERVICE.

Prime Movers, Generation and Distribution.

The illustrations in this section need little general commentary to supplement the description printed with each. They indicate the kind of work done by the Company during 1922 in this important field, which comprises steam turbines, turbo-alternators, turbo-blowers, water turbines, internal combustion engines, large generators and alternators, rotary converters, transformers and switch-gear.

FIG. 1. THE MAIN BUILDING OF THE NEW POWER STATION OF THE LEICESTER CORPORATION, BUILT AND EQUIPPED BY THE ENGLISH ELECTRIC COMPANY.

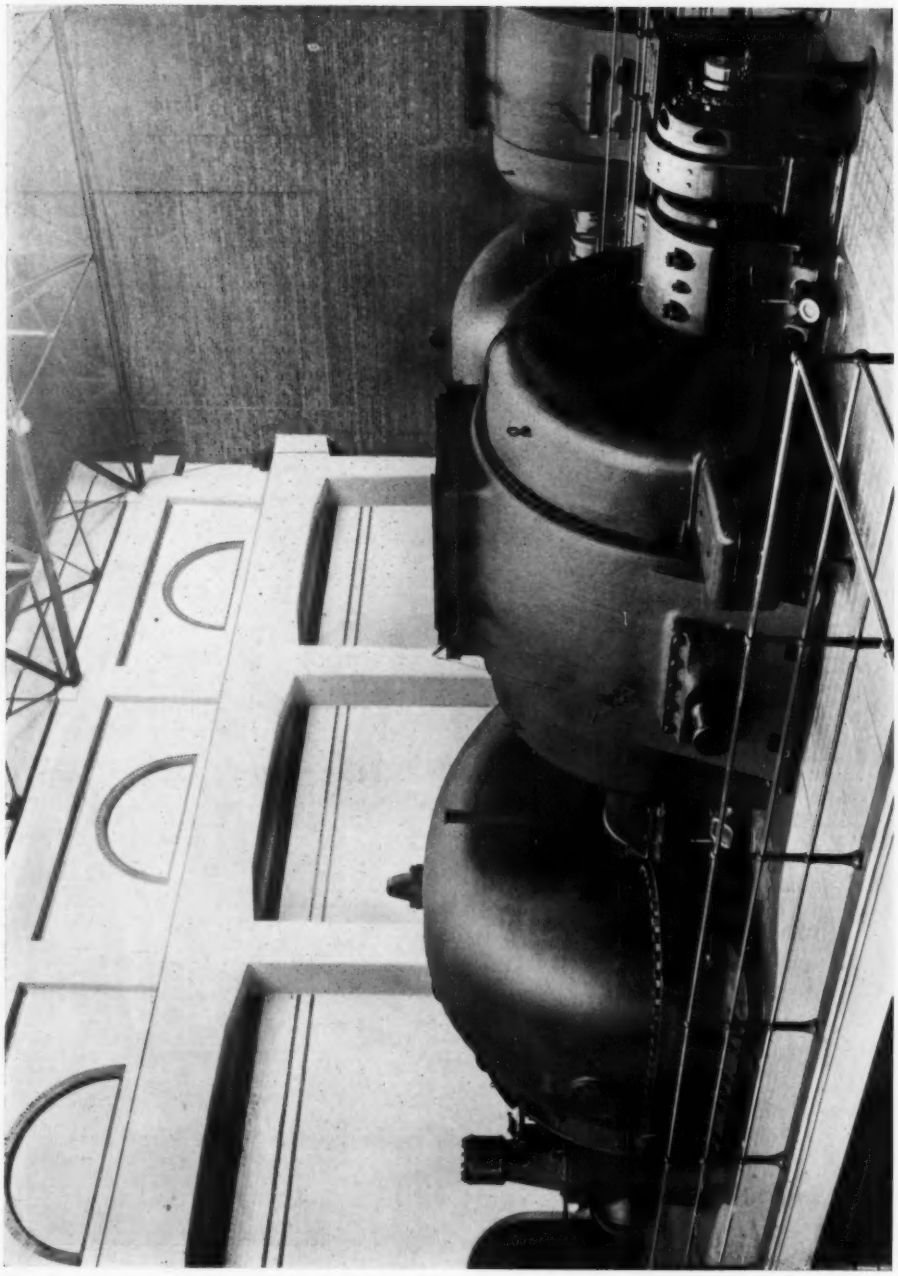


FIG. 2. TWO 23,500 K.V.A. TURBO-ALTERNATOR SETS, RUNNING AT 1,500 R.P.M., SUPPLIED TO THE GLASGOW CORPORATION.

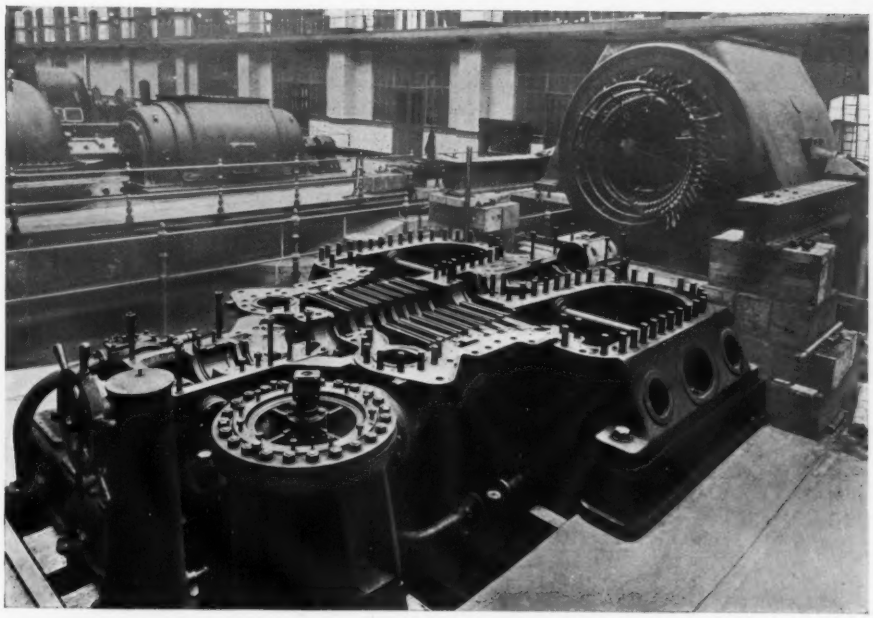


FIG. 3. A 12,500 K.W., 3,000 R.P.M TURBO-ALTERNATOR SET BEING ERECTED IN THE BOLTON CORPORATION POWER HOUSE. THE ALTERNATOR IS SEEN IN THE BACKGROUND IN PROCESS OF WINDING.

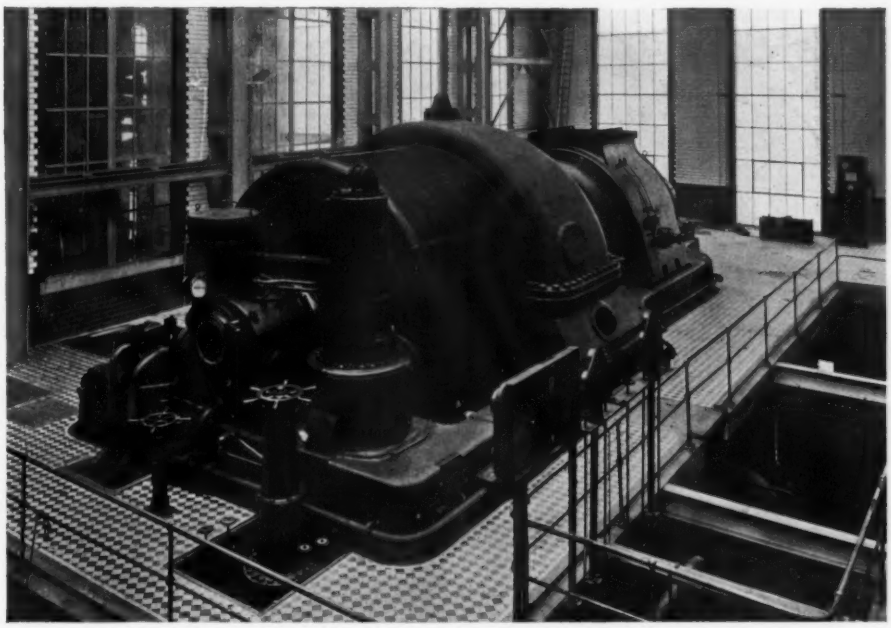


FIG. 4. A 10,000 K.W. TURBO-ALTERNATOR SET RUNNING AT 1,500 R.P.M., IN THE NEW POWER STATION OF THE LEICESTER CORPORATION.

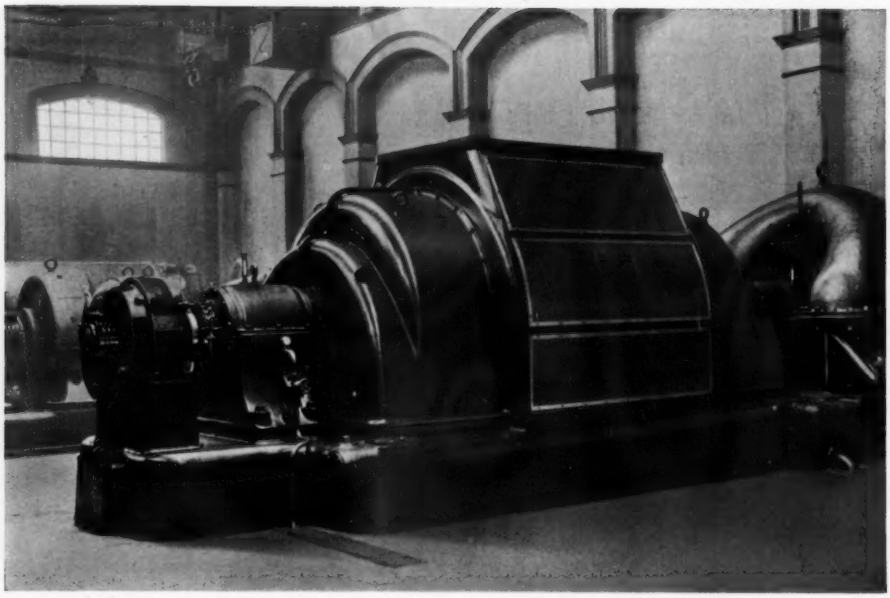


FIG. 5. A 13,900 K.V.A. TURBO-ALTERNATOR RUNNING AT 3,000 R.P.M. RECENTLY SET TO WORK IN A LARGE LONDON POWER STATION.

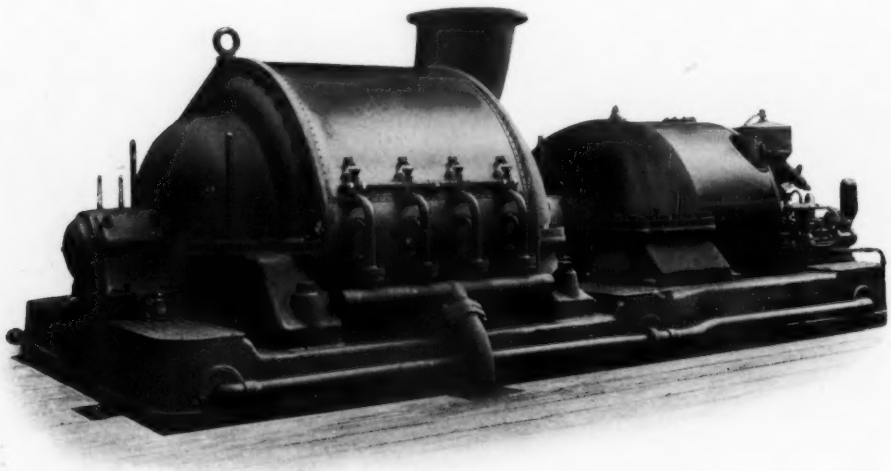


FIG. 6. TURBO-BLOWER FOR BLAST-FURNACE WORK. THE BLOWER HAS A NORMAL DUTY OF 37,500 CUBIC FEET OF FREE AIR PER MINUTE AT 15 LBS. PER SQUARE INCH PRESSURE AND IS DIRECT-COUPLED TO A 2,400 H.P. STEAM TURBINE.

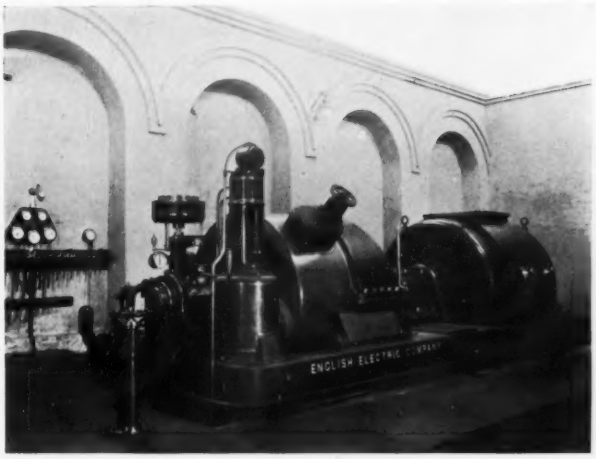


FIG. 7. ONE OF THE 3,000 K.W., 3,000 R.P.M. TURBO-ALTERNATOR SETS IN THE NEW POWER STATION OF THE CAWNPORE ELECTRIC SUPPLY CORPORATION.

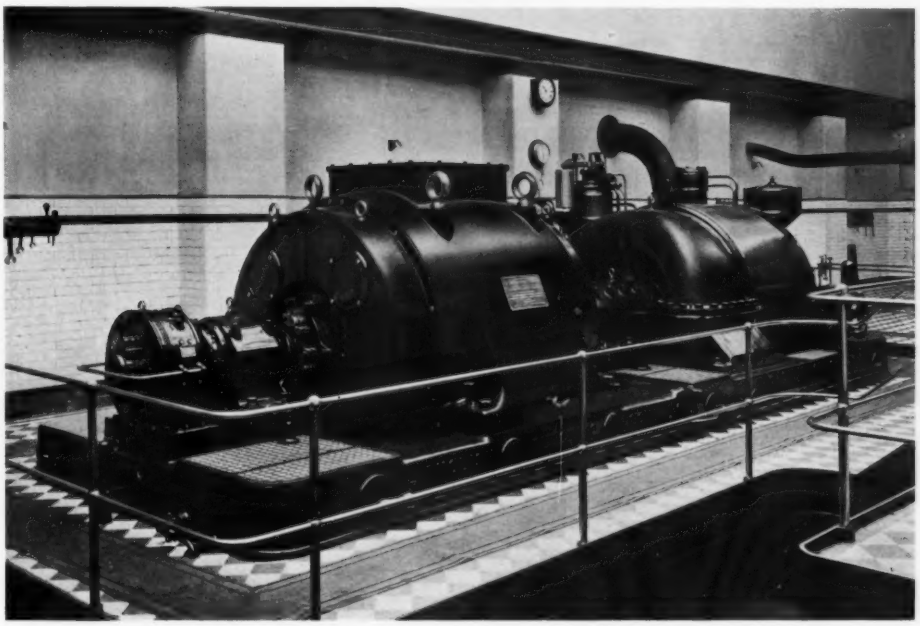


FIG. 8. 2,000 K.W. PASS-OUT TURBO-ALTERNATOR SET IN THE POWER HOUSE OF A LARGE TEXTILE FACTORY.

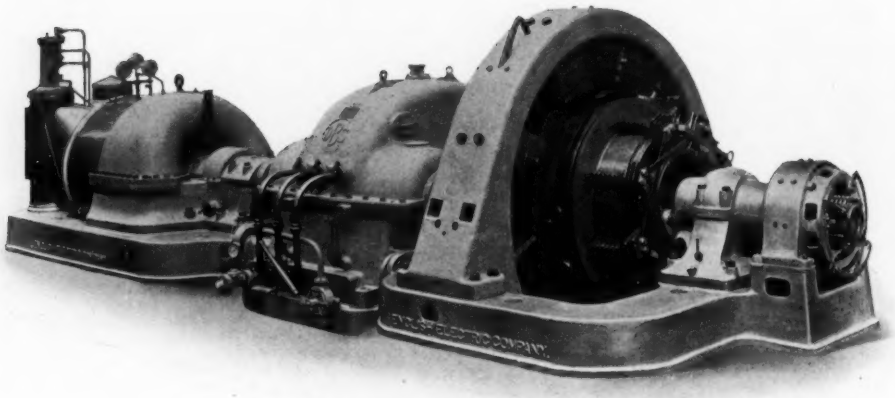


FIG. 9. 1,500-K.W., 1,500-VOLT GEARED D.C. TURBO-GENERATOR SET, SUPPLIED TO THE NEW ZEALAND GOVERNMENT.

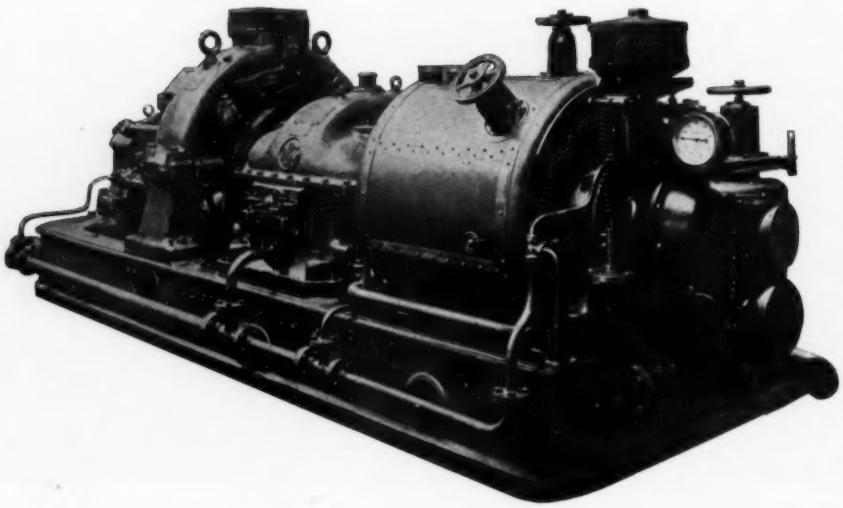


FIG. 10. 300-K.W. GEARED D.C. TURBO-GENERATOR SET SUPPLIED TO THE CUNARD STEAMSHIP COMPANY FOR ELECTRICAL SUPPLY ON BOARD SHIP.

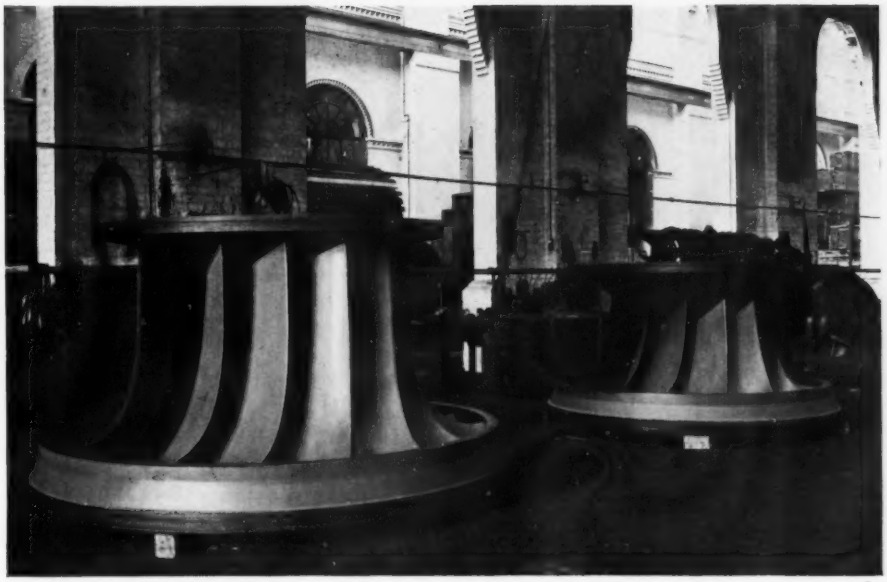


FIG. 11.

FIGS. 11 & 12 SHOW PORTIONS OF THE WATER TURBINES UNDER CONSTRUCTION FOR THE LINTON LOCK HYDRO-ELECTRIC STATION OF THE YORK CORPORATION. THE UPPER VIEW SHOWS THE RUNNERS FOR ONE OF THE TWO LARGE TURBINES AND FOR THE SMALL TURBINE RESPECTIVELY, AND THE LOWER VIEW ONE OF THE FOUNDATION RINGS WITH THE GATE APPARATUS BY WHICH THE FLOW OF WATER IS CONTROLLED.

FIG. 12.

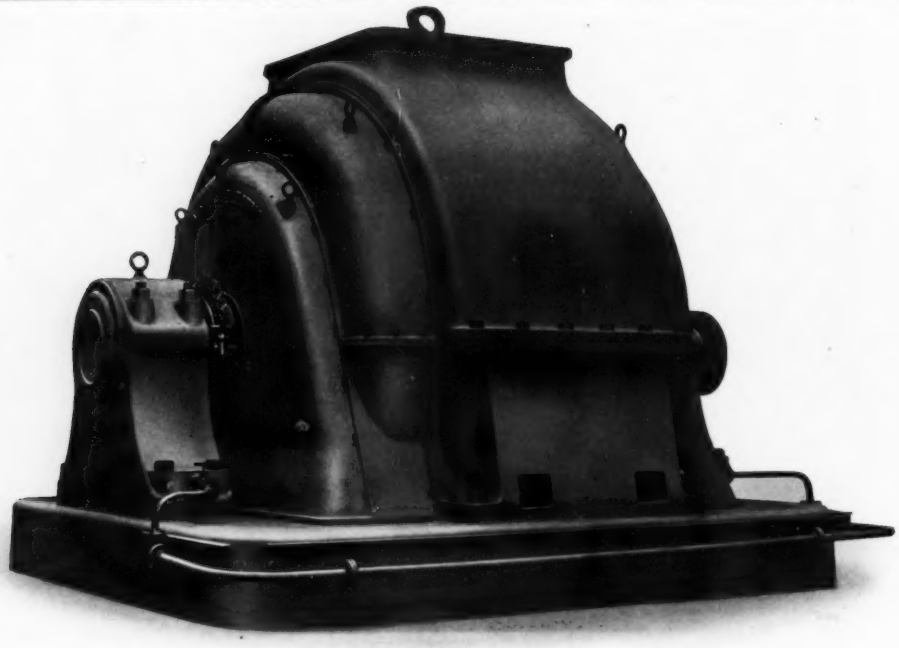


FIG. 13. 8000 K.V.A. WATER-TURBINE DRIVEN ALTERNATOR.

FIG. 14. HEAVY MACHINE BAY IN THE DICK, KERR WORKS, PRESTON, SHOWING LARGE WATER-TURBINE DRIVEN ALTERNATORS FOR THE MIDI RAILWAY AND FOR NEW ZEALAND.

FIG. 15.

FIGS. 15 & 16 SHOW THE ROTOR AND STATOR OF A 2,500 K.V.A., 150 R.P.M. WATER-TURBINE DRIVEN ALTERNATOR FOR WAIKATO, N.Z.

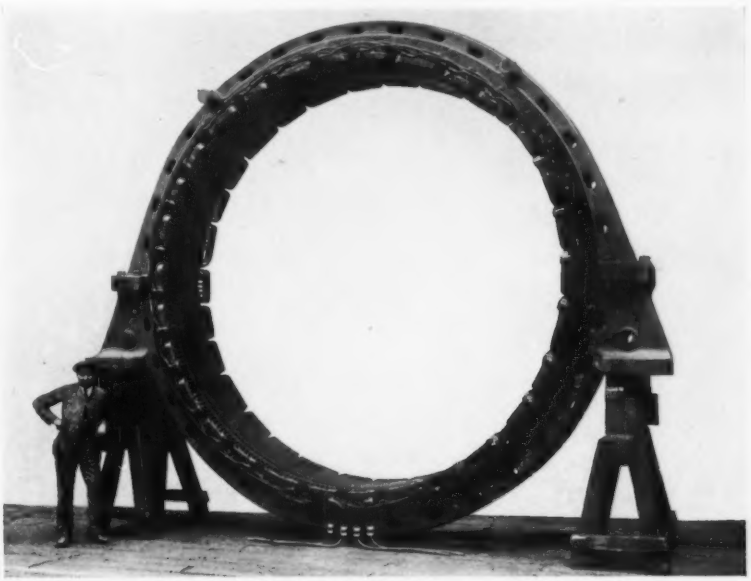


FIG. 16.

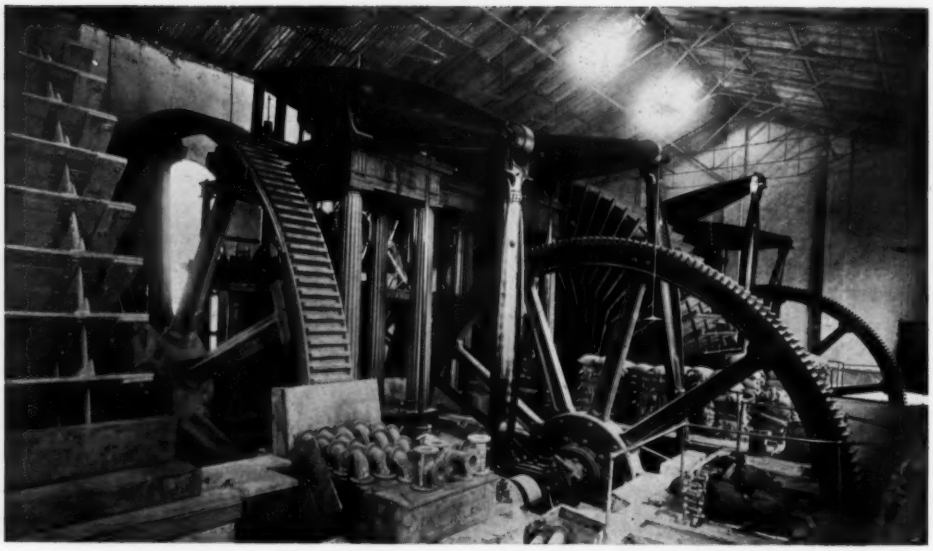


FIG. 17.

FIGS. 17 & 18. ATF PUMPING STATION, EGYPT. THE UPPER PICTURE SHOWS THE OLD BEAM ENGINES AND WATER-RAISING PLANT. THESE HAVE NOW BEEN REPLACED BY THE FOUR 335 B.H.P. WILLANS-DIESEL ENGINES SHOWN BELOW IN COURSE OF ERECTION FOR DRIVING MODERN CENTRIFUGAL PUMPS.

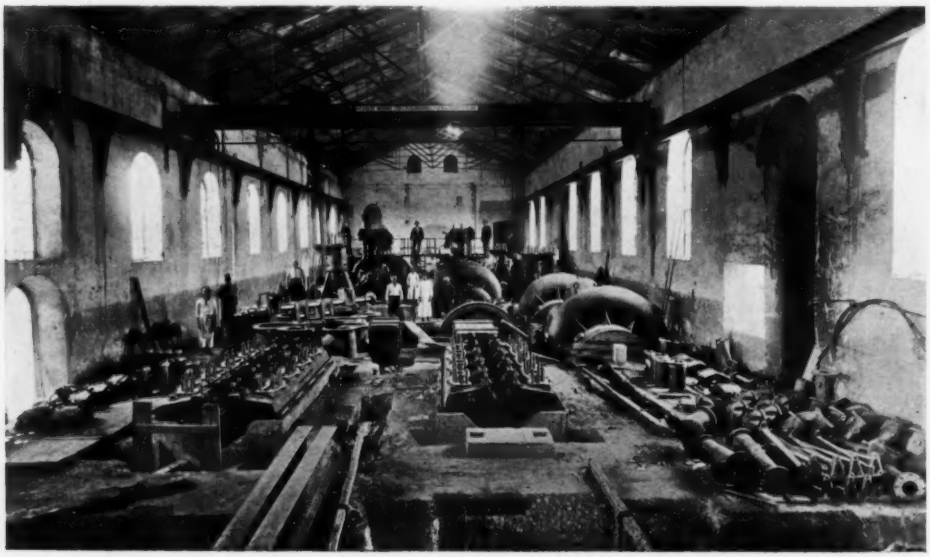


FIG. 18.

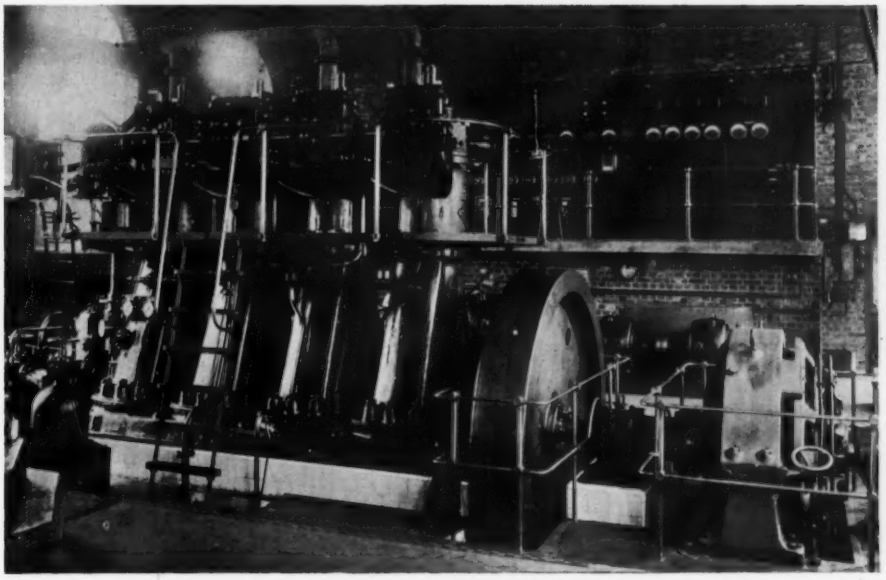


FIG. 19. A 335 B.H.P., 220 R.P.M. 4-CYLINDER DIESEL ENGINE DRIVING D.C. GENERATOR IN A PROVINCIAL MUNICIPAL POWER STATION.

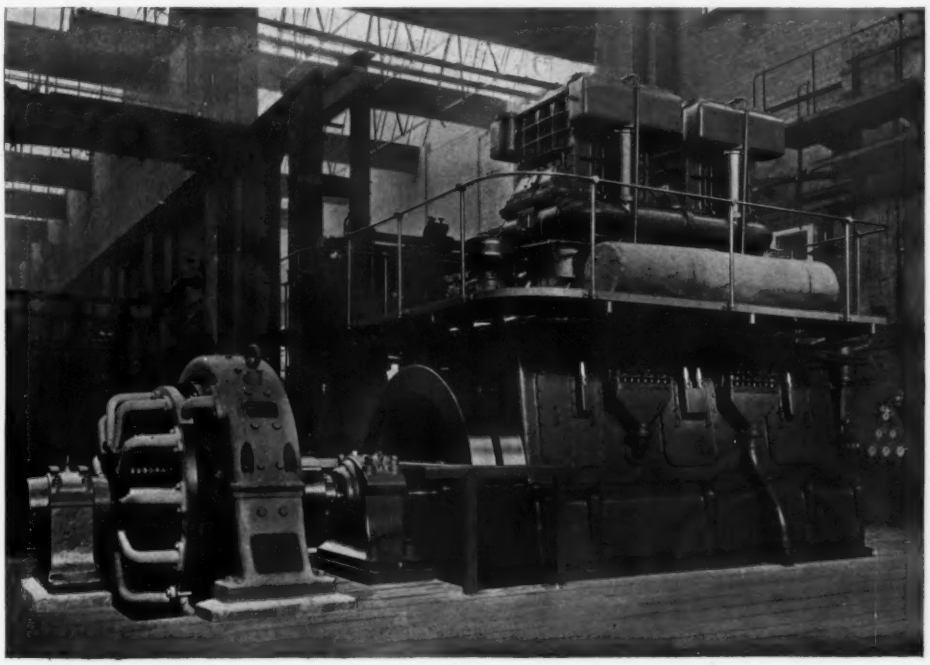


FIG. 20. A 750 B.H.P. FULLAGAR ENGINE DRIVING A 500 K.W. DIRECT CURRENT GENERATOR.

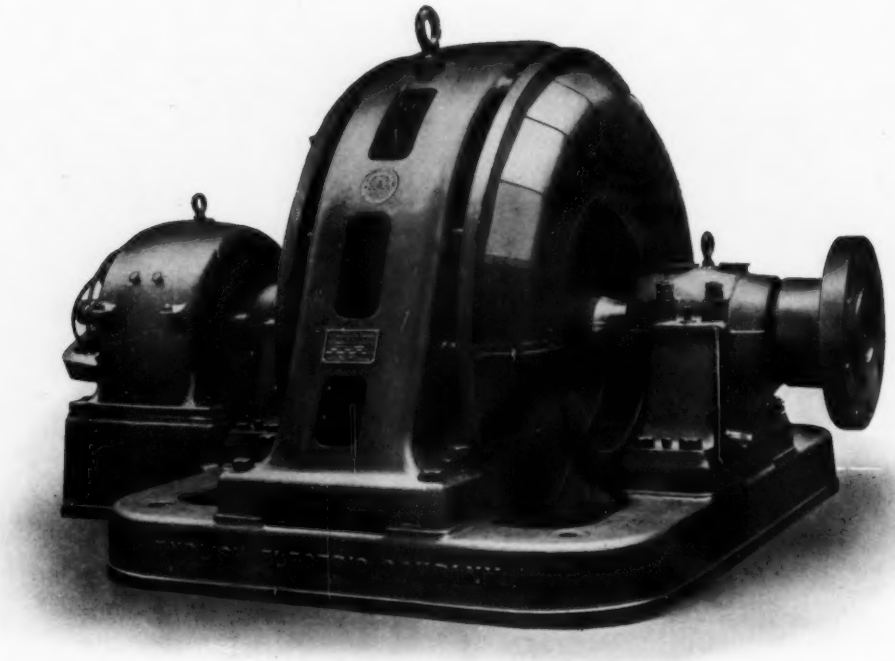


FIG. 21. SLOW-SPEED ALTERNATOR FOR DIRECT-COUPLING.

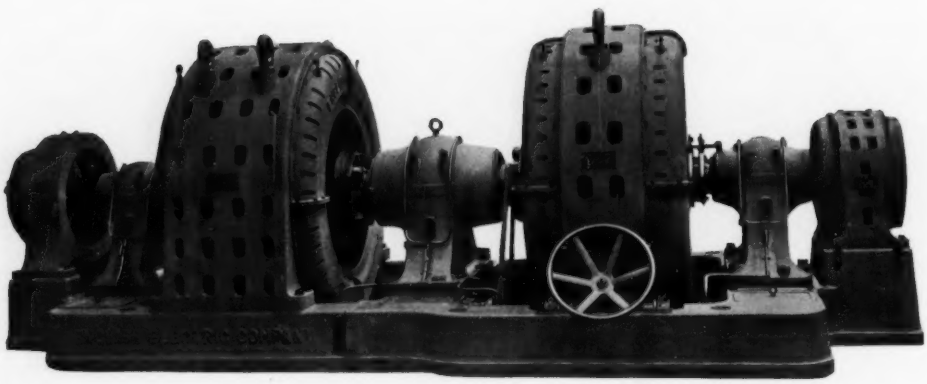


FIG. 22. 2,500 K.V.A., 500 R.P.M., FREQUENCY CHANGER SUPPLIED TO BLACKPOOL CORPORATION.

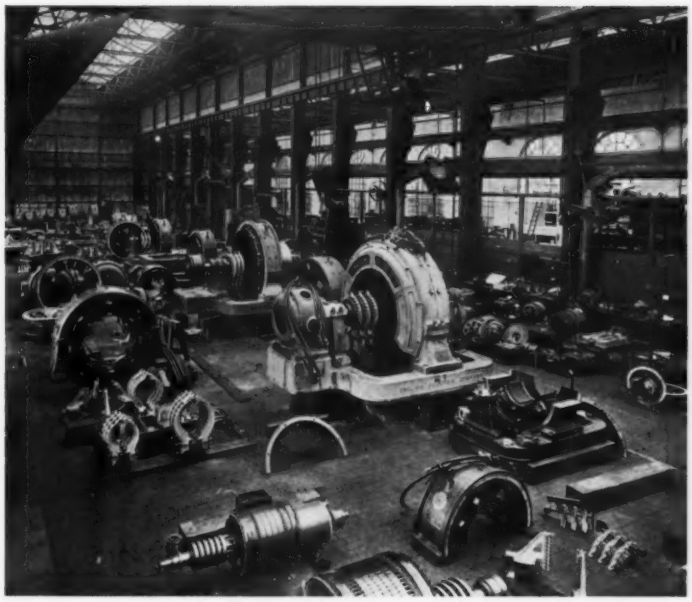


FIG. 23. ROTARY CONVERTER ERECTING SHOP AT SIEMENS WORKS, STAFFORD.

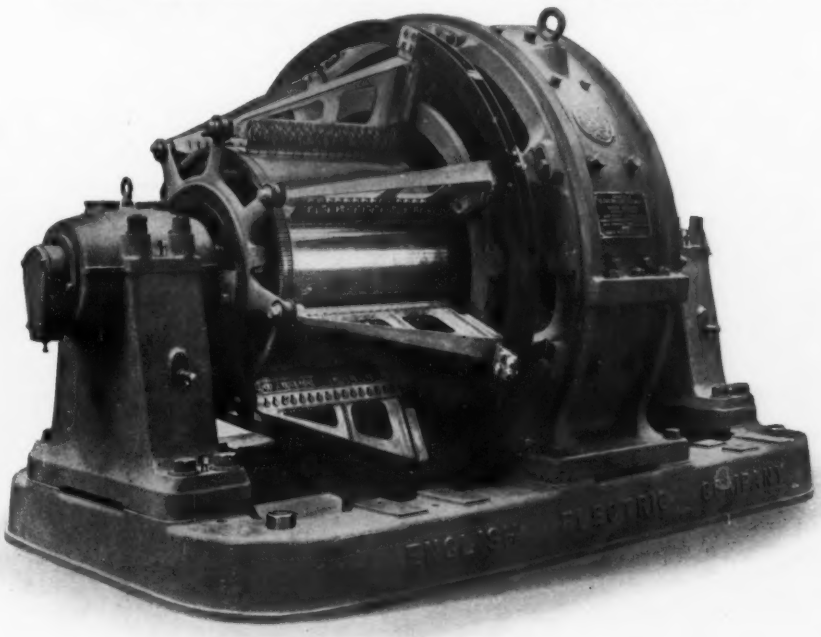


FIG. 24. 1000 K.W. HEAVY-CURRENT ROTARY CONVERTER SUPPLIED FOR THE SUB-STATION OF A LARGE INDUSTRIAL UNDERTAKING.

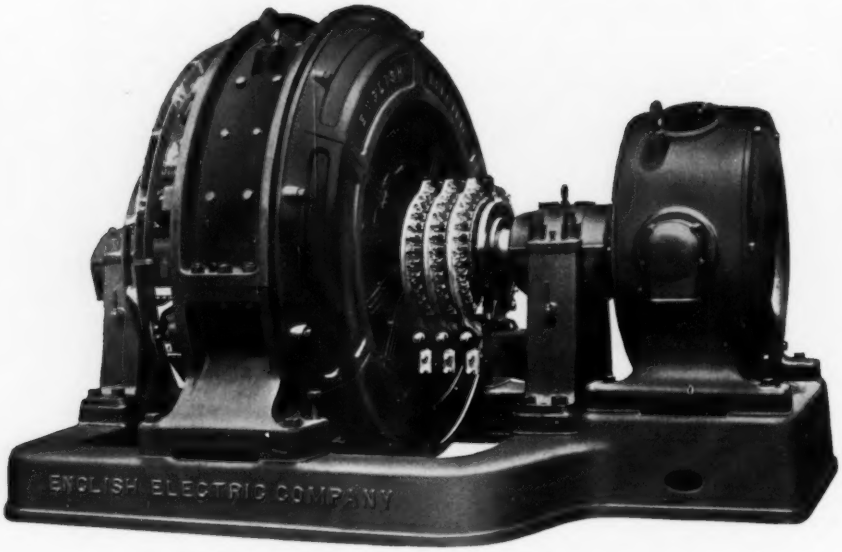


FIG. 25. 1,200 K.W. TRACTION ROTARY CONVERTER FOR A BRITISH RAILWAY COMPANY.

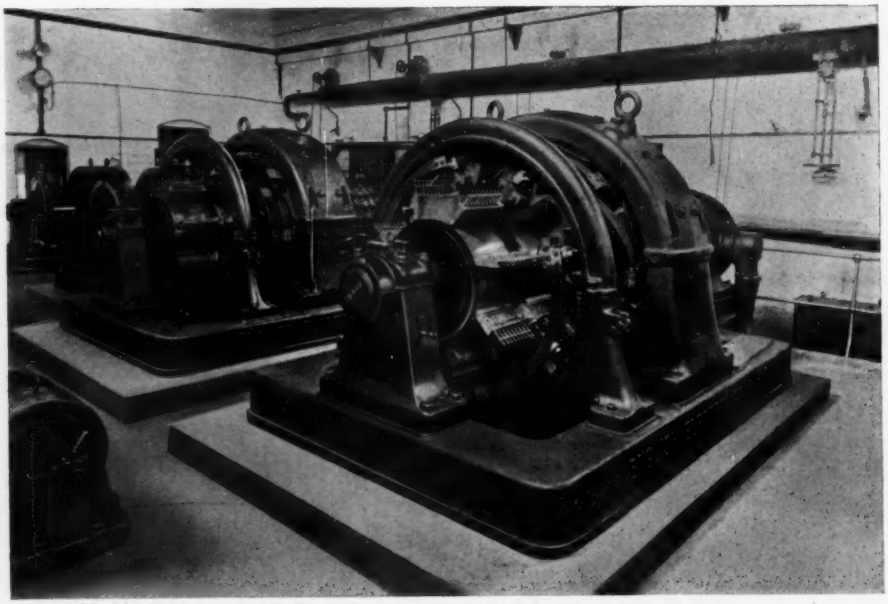


FIG. 26. FOUR ROTARY CONVERTERS IN THE NEW SUB-STATION OF THE CAWNPORE ELECTRIC SUPPLY CORPORATION.

FIG. 27. 1,600 K.V.A., 6,600-VOLT TRANSFORMER FOR USE WITH ROTARY CONVERTER.

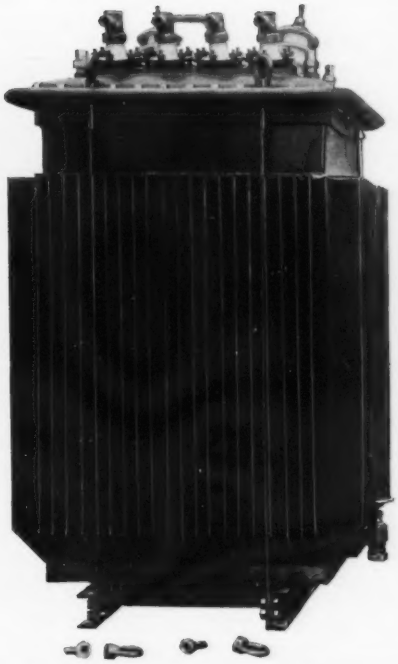


FIG. 28. 33,000-VOLT OUTDOOR TYPE TRANSFORMER.

FIG. 29. VIEW IN TRANSFORMER ERECTION SHOP.

FIG. 30. THE SWITCH HOUSE AT THE NEW POWER STATION OF THE LEICESTER CORPORATION DESIGNED AND EQUIPPED BY THE ENGLISH ELECTRIC COMPANY.

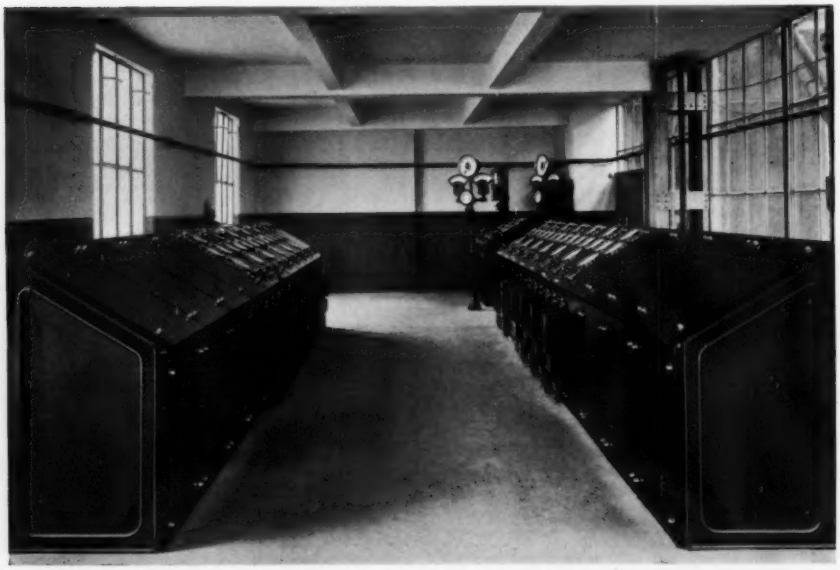


FIG. 31. CONTROL ROOM AT THE NEW POWER STATION OF THE LEICESTER CORPORATION FOR ELECTRICAL REMOTE OPERATION OF THE SWITCHGEAR.

FIG 32.—SHEET-STEEL DRAW-OUT TRUCK-TYPE SWITCHBOARD FOR 11,000 VOLTS.

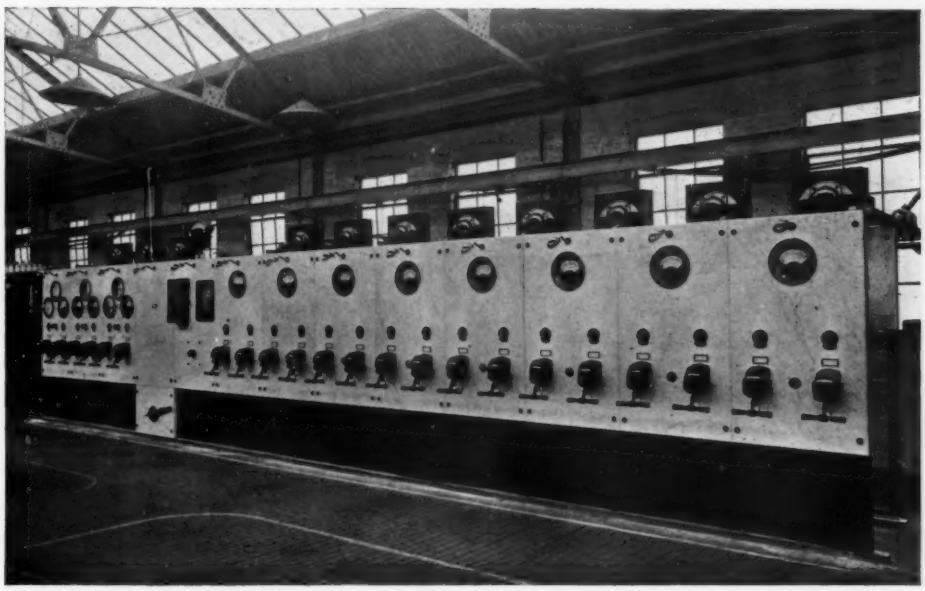


FIG. 33. SWITCHBOARD FOR THE JAPANESE GOVERNMENT BEING ERECTED AT STAFFORD WORKS. THIS BOARD IS FOR THE CONTROL OF A TRACTION SUB-STATION.

Electricity in Industry.

In this section some of the more important industrial applications of electricity are illustrated. Owing to the conditions of trade the year was one of unequal development in different industries. Electrical plant for iron and steel works in particular was not in demand and it was only towards the end of the year that the Company obtained the first order for the electrical equipment of a large rolling mill which had been placed in this country since 1920. But the illustrations will show the almost universal applicability in modern conditions of the electric drive, and in some instances especially the very striking saving in weight and space, apart from any other consideration, due to the conversion to electrical operation will be obvious.

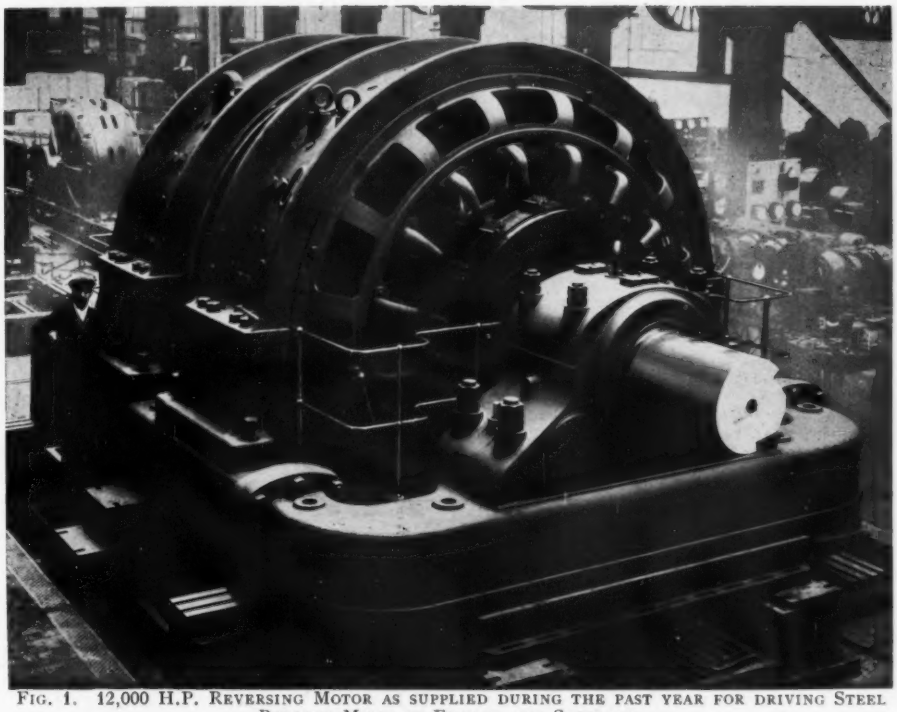


FIG. 1. 12,000 H.P. REVERSING MOTOR AS SUPPLIED DURING THE PAST YEAR FOR DRIVING STEEL ROLLING MILLS IN FRANCE AND SCOTLAND.

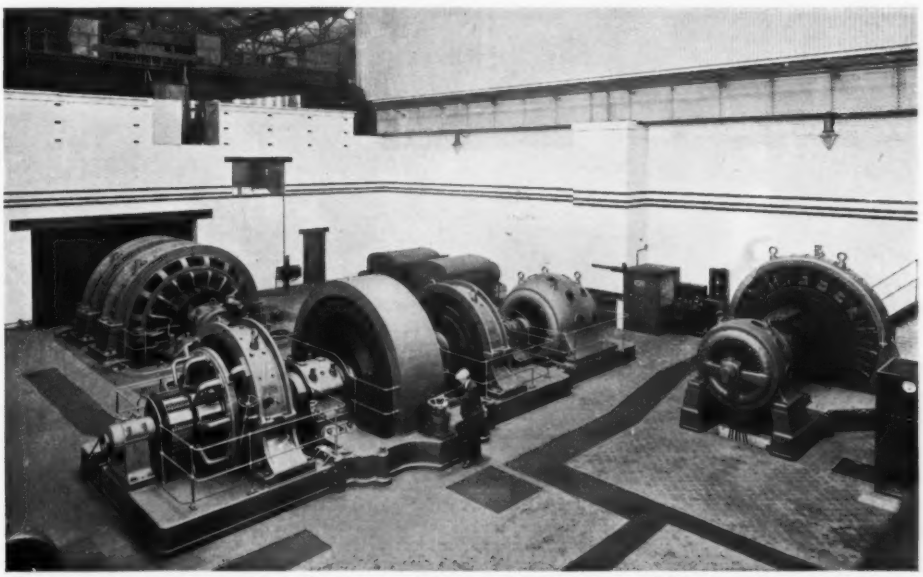


FIG. 2. COMPLETE ELECTRICAL EQUIPMENT FOR LARGE STEEL ROLLING MILL RECENTLY SET TO WORK IN SCOTLAND, SHEWING 13,000 H.P. REVERSING MOTOR, 50 TON FLYWHEEL CONVERTER SET AND ROTARY CONVERTER.

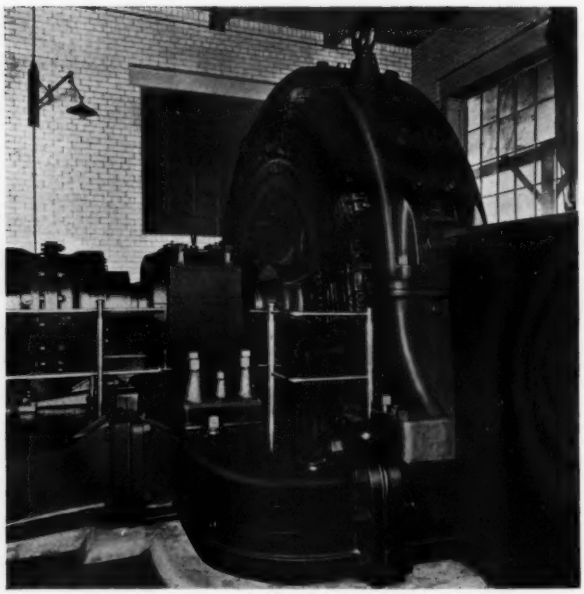


FIG. 3. 2,000 H.P. DIRECT-CURRENT MOTOR DRIVING 14 IN. MERCHANT MILL FOR ROLLING SPECIAL STEEL SHEETS.

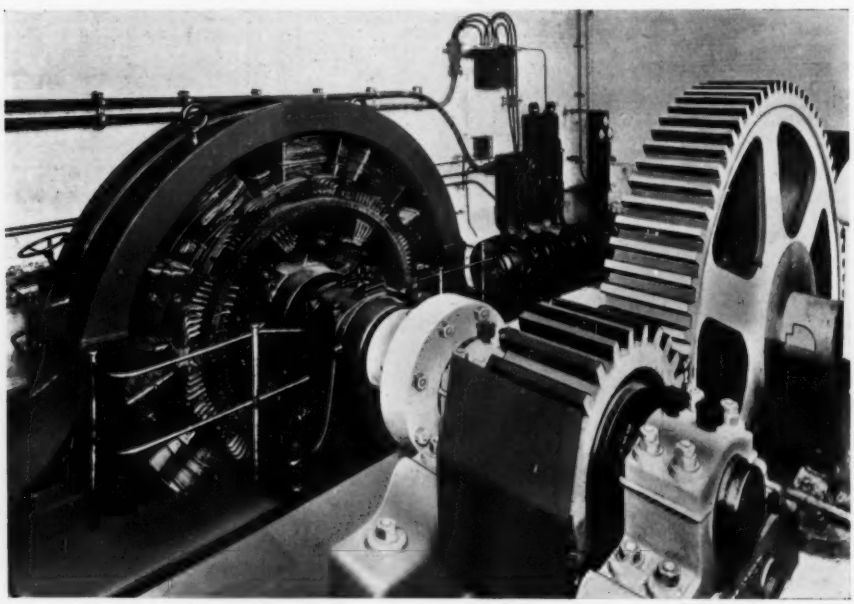


FIG. 4. 1,200 H.P. REVERSING MOTOR DRIVING MILL FOR ROLLING NICKEL SHEETS.

FIGS. 5 AND 6 SHOW THE WINDING PLANT AT THE TREHARRIS PIT OF THE OCEAN COAL CO.

THE LARGE VIEW IS OF THE OLD STEAM ENGINE, SOME 40 FEET HIGH, BEING DISMANTLED; THE LOWER PICTURE SHOWS THE NEW ELECTRICAL EQUIPMENT, THE MOTOR OF WHICH STANDS LESS THAN 9 FEET ABOVE THE FLOOR LEVEL.

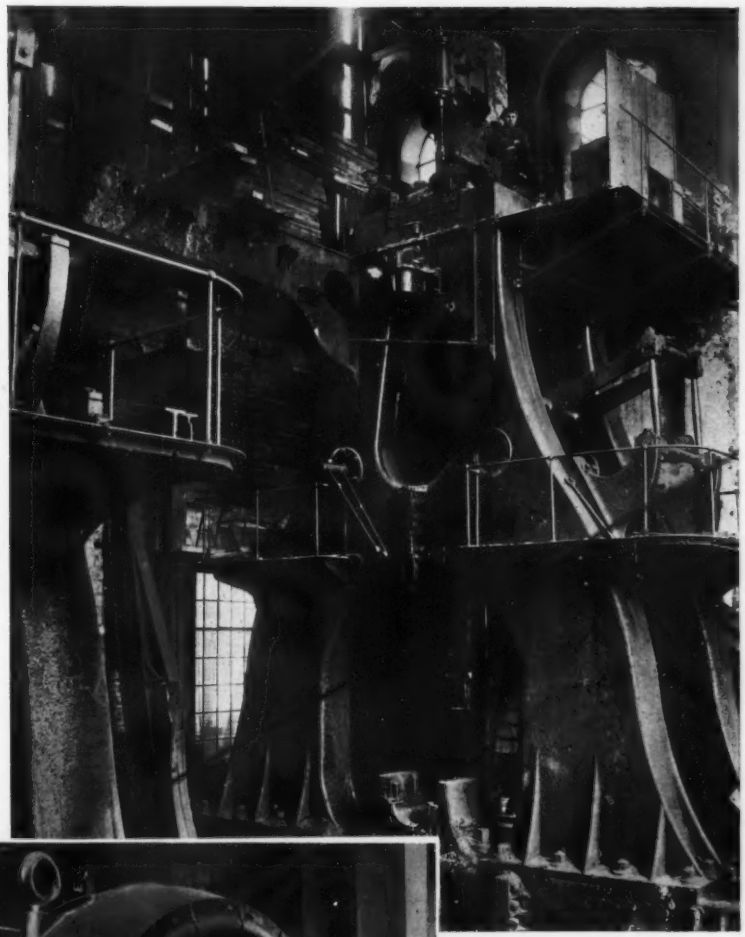


FIG. 5.

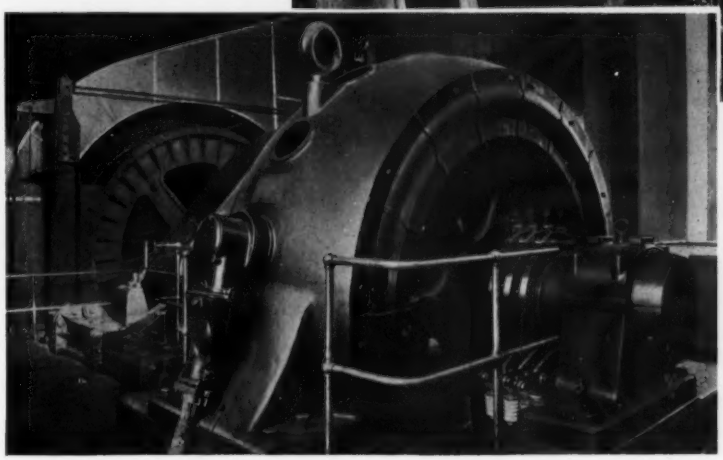


FIG. 6.

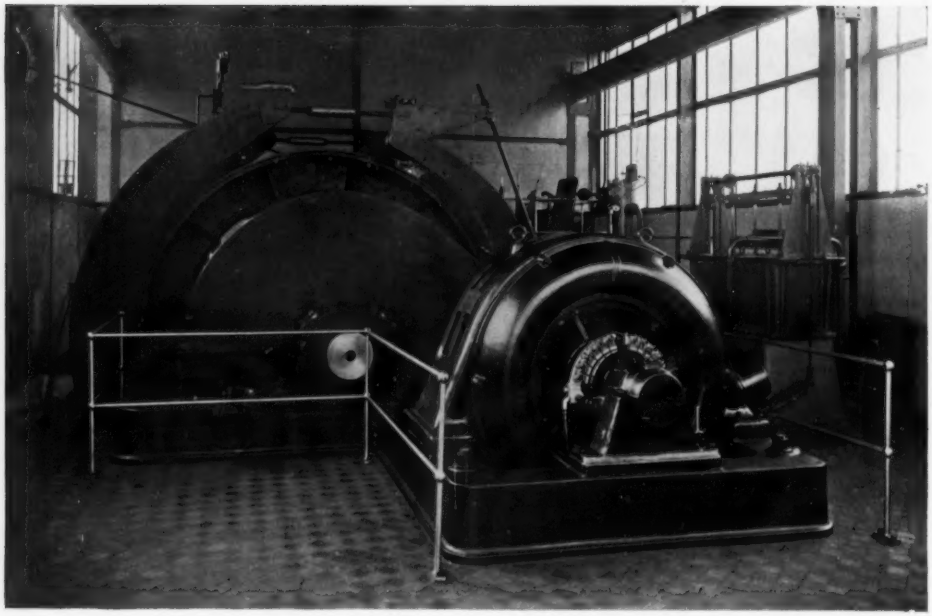


FIG. 7. ELECTRICALLY-DRIVEN WINDING ENGINE AT THE LLANHARAN PIT OF THE POWELL DUFFRYN COAL CO. THE "ENGLISH ELECTRIC" 3-PHASE MOTOR HAS A NORMAL RATING OF ABOUT 700 H.P.

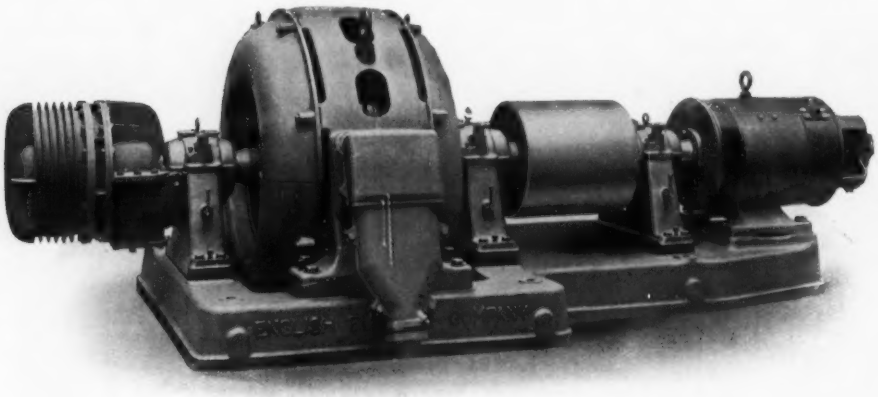


FIG. 8. ASYNCHRONOUS-SYNCHRONOUS MOTOR FOR DRIVING COLLIERY VENTILATING FAN.

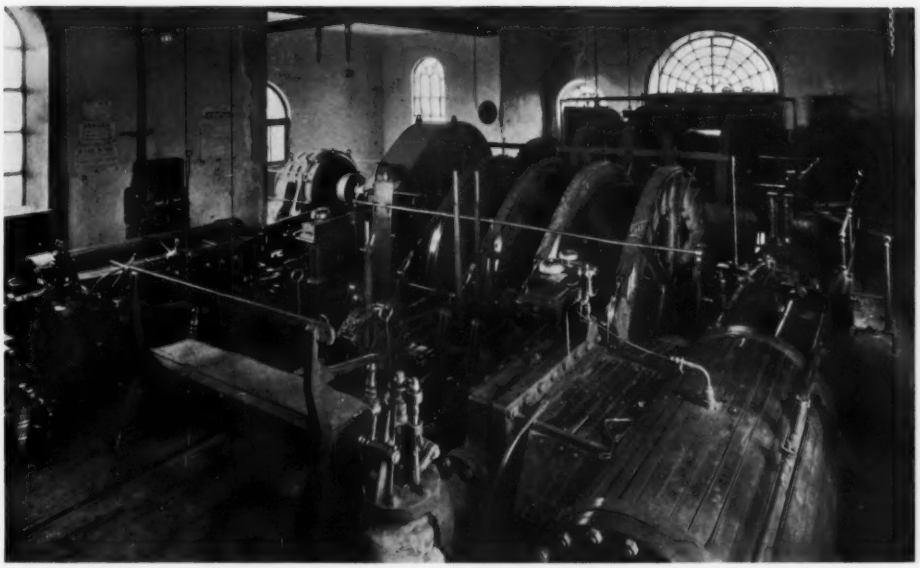


FIG. 9. COLLIERY HAULAGE GEAR CONSISTING OF FOUR DRUMS DRIVEN BY A SINGLE "ENGLISH ELECTRIC" INDUCTION MOTOR OF 550 H.P. THE FOREGROUND IS OCCUPIED BY THE OLD STEAM ENGINE; THE NEW MOTOR IS SEEN ON THE LEFT OF THE DRUMS.

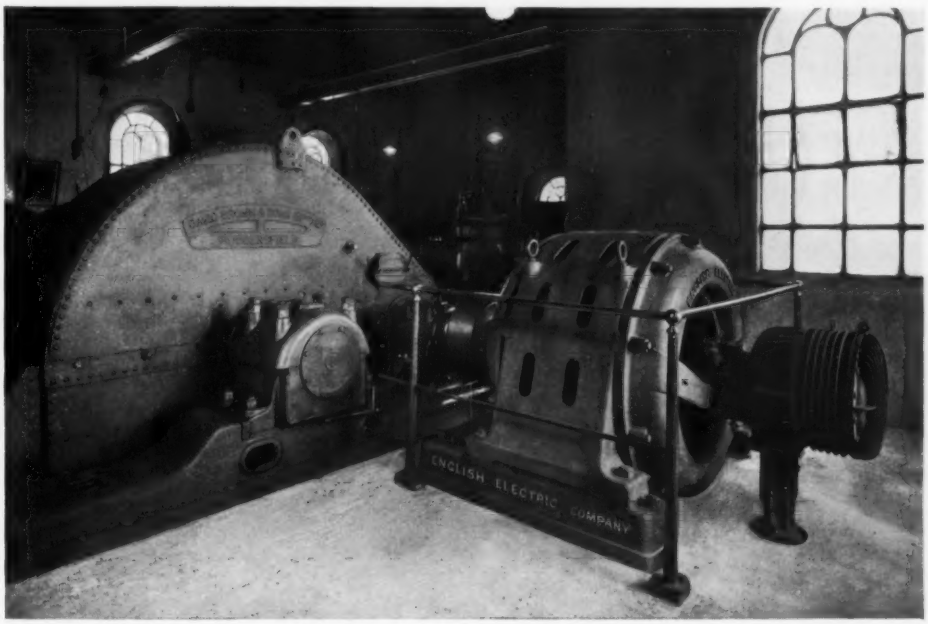


FIG. 10. ANOTHER VIEW OF THE HAULAGE GEAR SHOWN ABOVE, WITH THE MOTOR IN FOREGROUND.

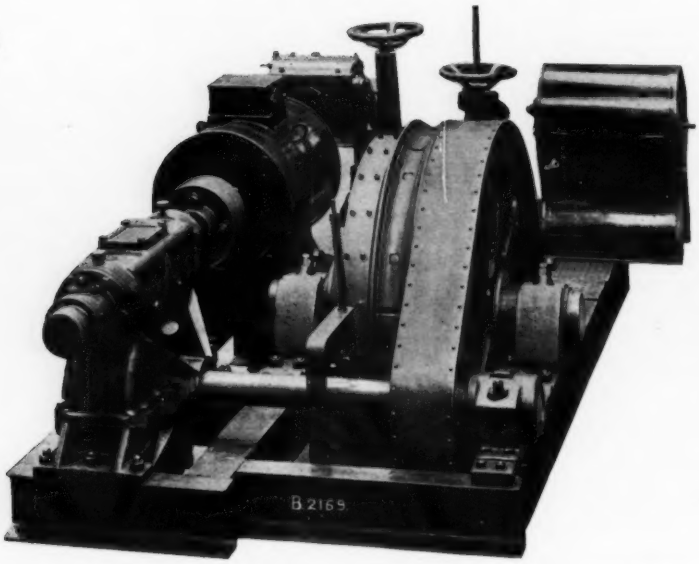


FIG. 11. ENDLESS ROPE HAULAGE GEAR FOR INDIA DRIVEN BY 3-PHASE "ENGLISH ELECTRIC" MOTOR. HAULAGE SUPPLIED BY MESSRS. M. B. WILD & CO., LTD.

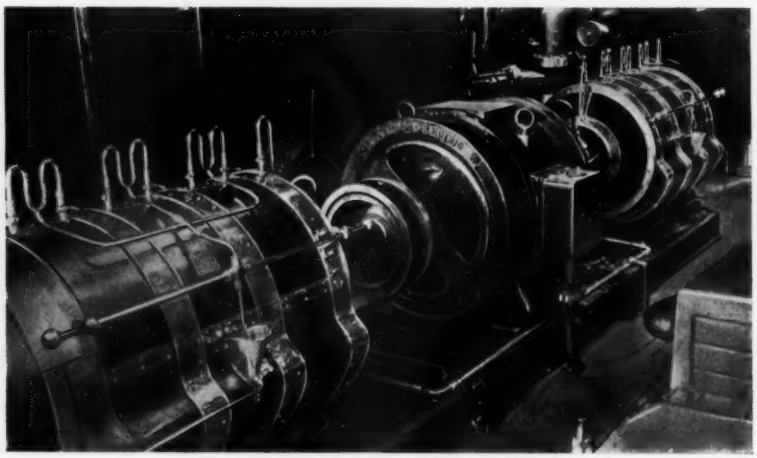


FIG. 12. TWO HIGH-LIFT TURBINE PUMPS DRIVEN BY AN "ENGLISH ELECTRIC" INDUSTRIAL-TYPE 3-PHASE MOTOR OF 250 B.H.P.

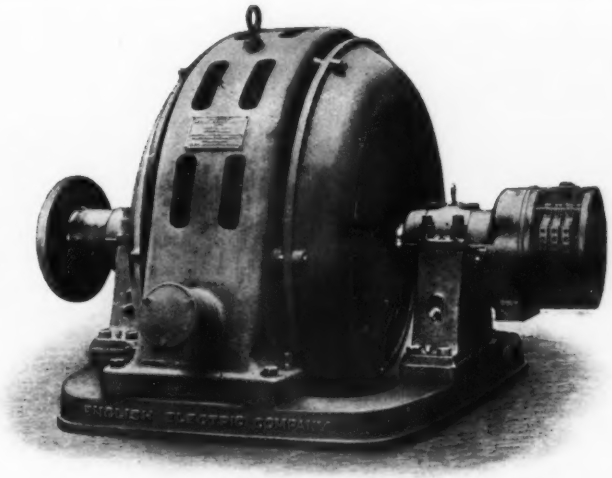


FIG. 13. PEDESTAL-BEARING TYPE INDUCTION MOTOR OF 430 H.P., SHIPPED TO AUSTRALIA FOR DRIVING AN AIR COMPRESSOR.

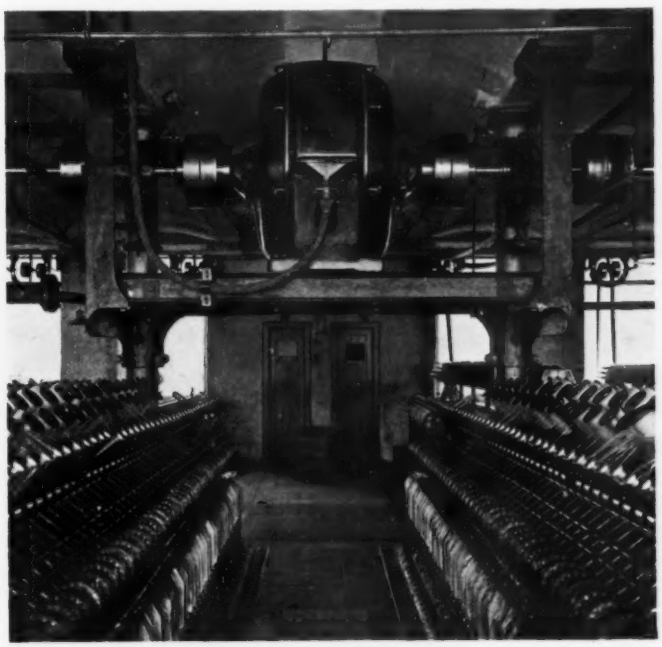


FIG. 14. TYPICAL LINE-SHAFT DRIVE IN A LARGE TEXTILE FACTORY, BY "ENGLISH ELECTRIC" INDUCTION MOTOR OF 140 H.P.

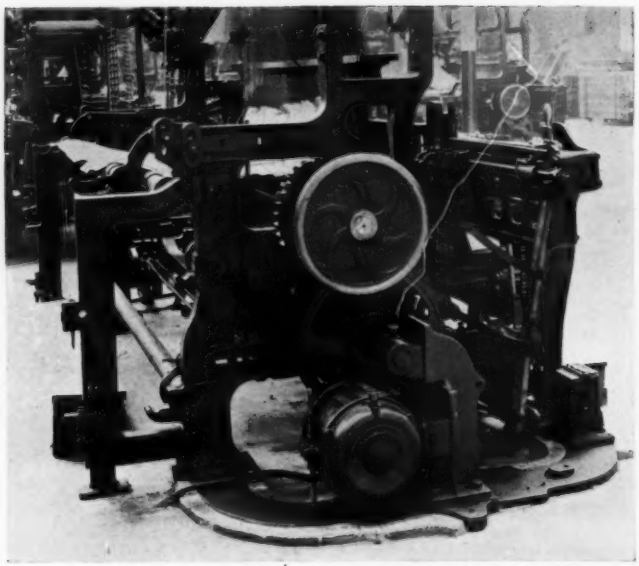


FIG. 15.—AN EXAMPLE OF A LOOM INDIVIDUALLY DRIVEN BY AN "ENGLISH ELECTRIC" TEXTILE-TYPE INDUCTION MOTOR.

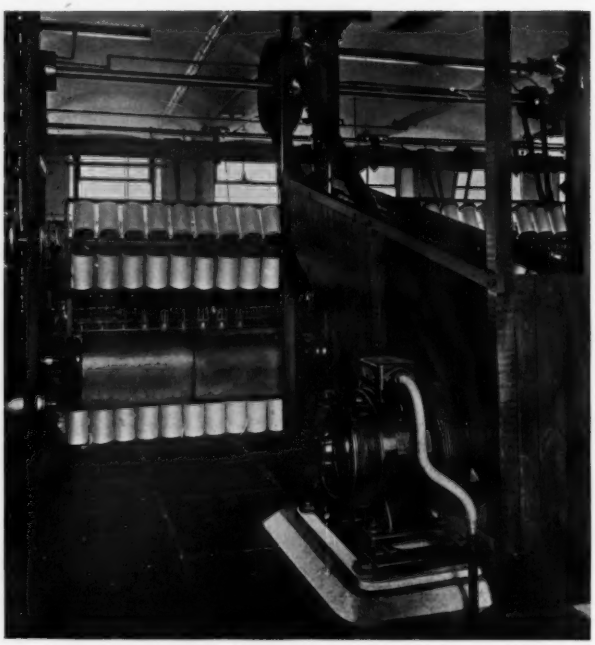


FIG. 16. TYPICAL BELT DRIVE BY STANDARD INDUSTRIAL MOTOR IN HEAVY TEXTILE MILLS.

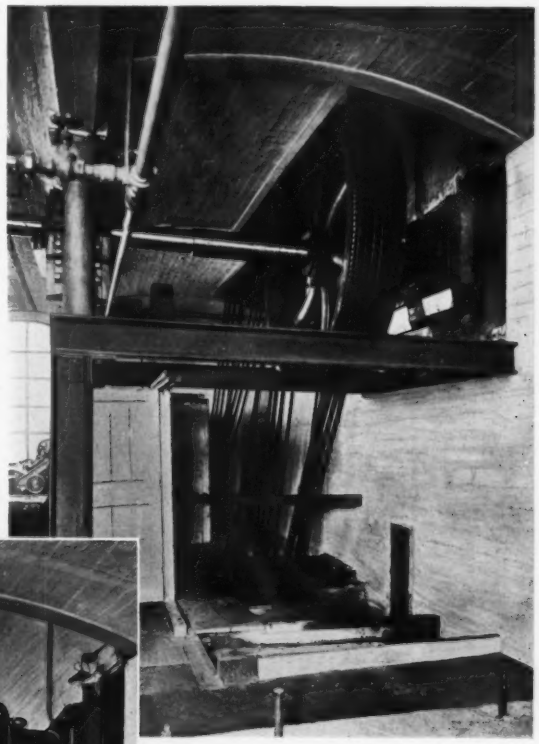


FIG. 17. OLD ROPE DRIVES IN LARGE TEXTILE FACTORY RECENTLY CONVERTED TO ELECTRIC DRIVING.

FIG. 18. THREE-PHASE MOTOR INSTALLED IN PLACE OF THE ROPE DRIVE SHOWN ABOVE.

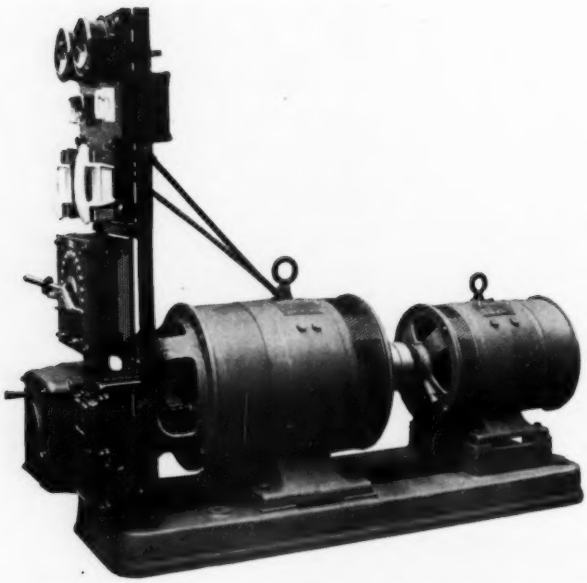


FIG. 19. SELF-CONTAINED MOTOR-GENERATOR SET FOR ELECTRIC WELDING.

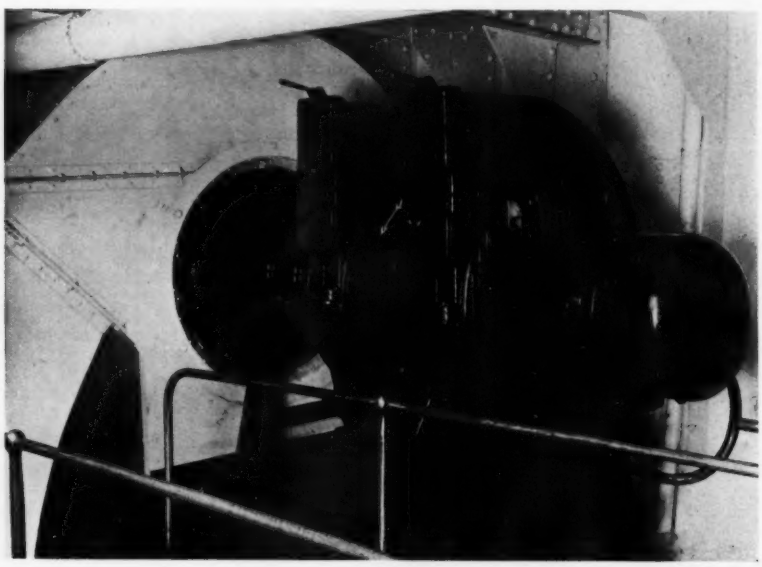


FIG. 20. TOTALLY-ENCLOSED INDUCTION MOTOR DRIVING FAN ON BOARD SHIP.

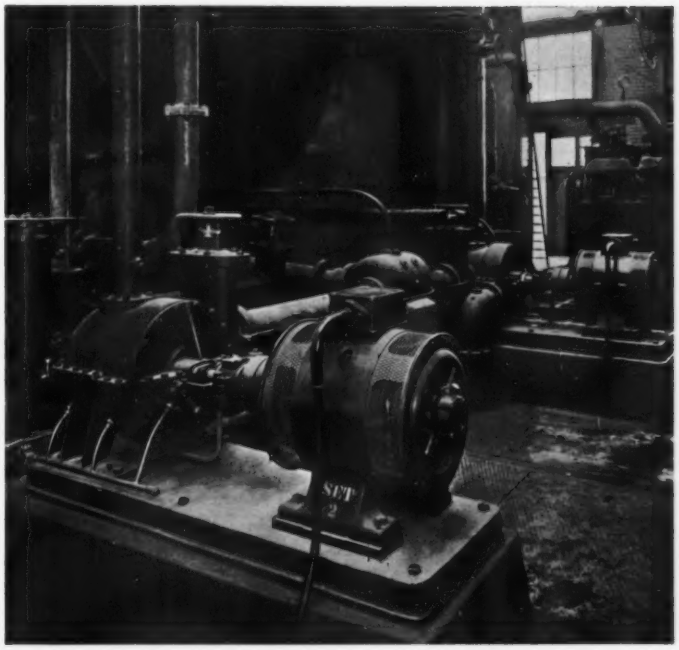


FIG. 21. INDUCTION MOTORS DRIVING PUMPS IN BASEMENT OF LARGE MUNICIPAL POWER STATION.

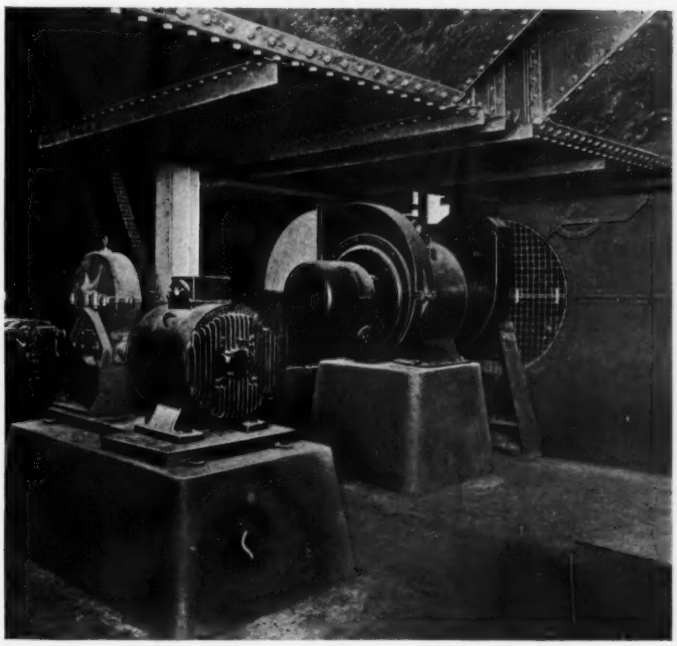
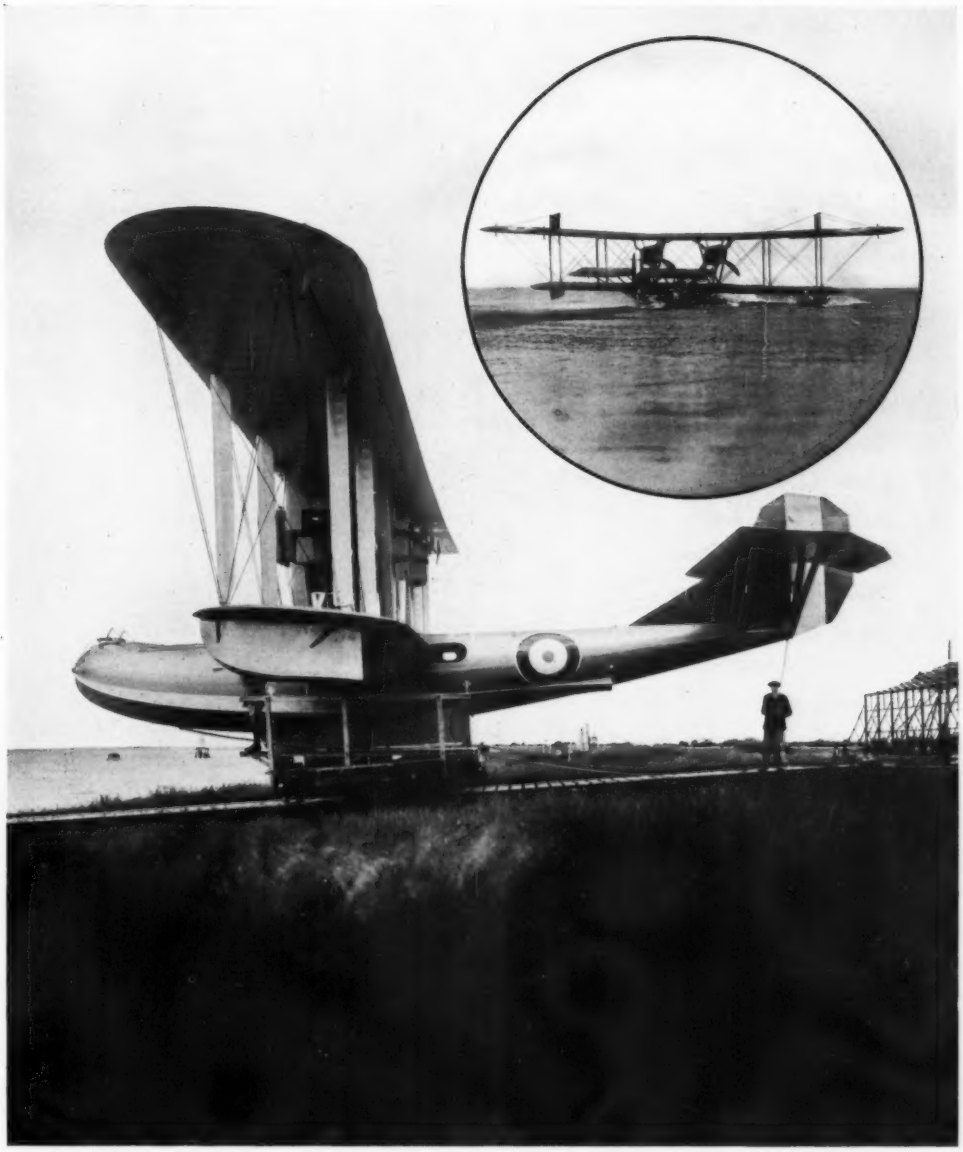


FIG. 22. PIPE-VENTILATED AND TOTALLY-ENCLOSED MOTORS DRIVING FORCED-DRAUGHT FAN AND MECHANICAL STOKER IN POWER HOUSE BASEMENT.

Aircraft.

The illustrations on the opposite page show one of the Flying Boats built for the Air Board at the Company's Aircraft Works.



SCHEDULE OF MANUFACTURES OF THE ENGLISH ELECTRIC COMPANY, LIMITED.

Electric Generating Plant of all capacities.
Steam Turbines and Condensers.
Turbo-Blowers.
Water Turbines.
Internal Combustion Engines.
Rotary Converters.
Static Transformers.
Phase Advancers.
Switchgear and Controlling Apparatus of all kinds.
Electric Locomotives.
Electrical Equipment and Rolling Stock for Railways and Tramways.
Electric Plant for Rolling Mills, Iron, Steel, Copper Works, etc.
Electric Winding Equipments for Mines.
Electrical Equipment for Textile Mills.
Standard Industrial Motors.
High-Speed Twist Drills, Milling Cutters and Reamers.
Pneumatic Hammers and Drilling Machines.